Amateur Radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL. 56, No 3, MARCH 1988

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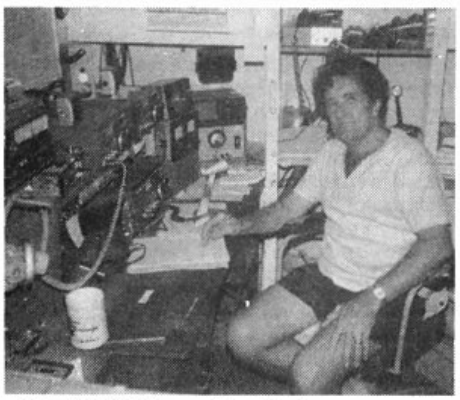
Amateur Radio



—Photograph courtesy Bill Murphy VK8ZWM

Geof VK8GF, from Alice Springs, was a guest at the Darwin ARC 21st Celebrations. (See centre pages for a pictorial display).

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All copy for inclusion in the May 1988 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, March 21, 1988.

Amateur Radio

Published monthly as the Official Journal by the Wireless Institute of Australia, founded 1910. ISSN 0002 — 6859. Registered Office: 3/105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

Inquiries and material to:
The Editor,
PO Box 300,
Caulfield South, Vic. 3162.

Material should be sent direct to **PO Box 300, Caulfield South, Vic. 3162,** by the 20th day of the second month preceding publication. **Note:** Some months are a few days earlier due to the way the days fall. Check page 1 for deadline dates. **Phone: (03) 528 5962.**

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Editor's Comment

ACROSS THE TASMAN

I began to write this on January 5, at Eltham. Not Eltham, Victoria, but Eltham, Taranaki, New Zealand, almost at the foot of snow-capped Mount Egmont. A magnificent site for repeaters, and of course there are two metre and 70 centimetre repeaters just below the summer snow-line.

Your Editor is enjoying a month in New Zealand, travelling the country in in a hired camper-van. We are the same two-couple group who so much enjoyed sailing the Whitsundays last September, as mentioned in a previous editorial. Amateur activities, as on that trip, are confined to two metres FM, mostly while stationary in motor parks, and mostly via local repeaters. Maybe some VHF purists will shudder, but one can acquire much valuable local knowledge this way.

I was much impressed by the help given me by the New Zealand RF Service (like the RF Management Division of DOTC) to enable me to enjoy this privilege. I wrote to RFS early in December, sending copies of my AOCP licence, etc, seeking a visitor's licence. Imagine my surprise to receive a telephone call from across the Tasman a few days before Christmas, telling me that their offices would be closed until January 5, and I would need to fill in a form and pay a fee. In the meantime I was nevertheless welcome to the call sign ZL0AHF!

(I filled in the form and paid the fee on January 8, at New Plymouth).

We arrived at Auckland airport on New Year's Eve, and we are scheduled to leave from Auckland on January 28. In these four weeks we will have travelled about 6000 kilometres in the camper-van, spending about the same time in each of the North and South Islands. We will be leaving the van in Christchurch and flying back to Auckland.

In answer to the inevitable question "What have been the highlights so far?", I can only say there have been many, and more are to come. There are three editorial travelogues about Australian trips awaiting composition before we can tackle a New Zealand story. But one of the highlights must be the QSO across the Tasman on 2FM on Friday, January 8, at 0425 UTC between VK2MT in Wollongong and ZL0AHF halfway up Mount Egmont (via the Kakaramea and Wollongong repeaters on Channel 7275). The locals tell me that trans-Tasman openings are not uncommon during the summer, but even so, and even though repeater-assisted, it was still a thrill!

For now, on January 14 near the beach at Ngakawau, I must say "haere ra" from "Aotearoa" and 73.

Bill Rice AX3ABP
(temporarily ZL0AHF)
Editor

INSATIABLE APPETITE

Amateur Radio Is always in need of a steady supply of articles for publication, whether they be short technical tips or long technical articles; even interesting anecdotes. Whilst articles on advanced and new techniques are needed, it must not be forgotten that new amateurs and novices are always interested in good basic items which the "seasoned amateur" may class as too basic for AR. So, write-up that project that has worked for you, as *Amateur Radio* has an enormous appetite for a well-balanced and varied diet.

Preparing an article for *Amateur Radio* is very simple. Just commit your thoughts to paper as you would when explaining to a friend over the air. Manuscripts may be clearly handwritten or typed **original** copies (*no photocopies please as the photocopier invariably prints blank in a crucial portion of a technical explanation or mathematical formula*). Include circuit diagrams if applicable — they do not have to be ready for publication (clear sketches are adequate). Don't overlook a photograph too, but please be careful when labelling them — many good photographs have been damaged by heavy ball-point pen marks coming through from the back or felt-tip pens smudging from the back of one to the front of another!

Main QSP

WARC 92 (?) — A WIA POSITION

INTRODUCTION

With indications that there could well be a World Administrative Radio Conference (WARC) of the ITU, perhaps called something different, as early as 1992, involving the review of frequency allocated to the Amateur Service, it is therefore essential that the WIA gives early consideration to its position, particularly as the IARU Region III position may well be developed at the Seoul Conference in late 1988. Indeed, if a position is not developed then, the development of a Regional position may well be too late to influence the other Regions.

1. AIM

This paper proposes an initial WIA position in respect of Australian amateur involvement in such a Conference.

2. IARU ADVICE

IARU advises that such a Conference could examine frequency bands including, or affecting, the bands allocated to the Amateur Service at 7 MHz, and all the bands above 420 MHz to 5 GHz.

In 1985, at the Region III Conference in Auckland, a preliminary position in respect of amateur bands was developed, and similar positions have been discussed at the Region I and II Conferences since then.

There is concern in Region I at the apparent hardening of attitudes to the Amateur Service by some administrations — "Amateurs have too much under utilised valuable spectrum allocated already."

3. THE AREAS OF POSSIBLE WIA INVOLVEMENT

The WIA can advance the Amateur Service position,

3.1 By influencing the development of the IARU position,

3.2 By supporting and encouraging Region III in its participation in an IARU delegation to any Conference,

3.3 By participating in the development of an Australian national position, including involvement in the CCIR preparations, representing the Australian Amateur Service, consistently with an IARU policy,

3.4 By seeking and providing one or more accredited members of the Australian delegation to such a Conference.

The first two are funded through the Region III Association, and the cost is shared among the members of the Association, and the second two are entirely at the cost of the WIA.

4. THE VALUE OF NATIONAL INVOLVEMENT

The formulation of a global IARU policy, and the advancing of that position by national societies to their own administration, and an IARU delegation at a Conference is an important part of the advocacy to advance the amateur position.

However, the IARU delegation at a Conference can only have observer status, cannot vote and necessarily, as against the representatives of sovereign States, must keep a very low profile. It can lobby, but can only lobby in a way that preserves its creditability and acceptability.

The involvement of WIA national representatives in the preparation for a Conference, and as Australian delegates to a Conference, may enable the development and advancement of a position in ways not open to the IARU by itself.

5. NATIONAL REPRESENTATION AND THE IARU

Clearly, the more administrations persuaded to adopt the global IARU position, the more votes for that position. There is a positive disadvantage, for the Amateur Service, in the adoption at a national level, of positions different from the IARU position. They attract only one vote, a common position, if effectively advanced, will attract the votes each administration adopting them. Identification of a position at the national preparation stage as an IARU position will often assist the adoption of that position.

Once at a Conference an accredited delegate can only advance a national position. He is, however, no more restricted from liaising with the Amateur Service observer delegation than is the aeronautical service representative from liaising with the ICAO or IATA observer delegations, so long as he is not advancing a position different from his delegations national position.

Thus a close involvement in the development of an IARU position, and a close, but responsible, relationship with an IARU delegation at a Conference is the optimum position for a national representative to take.

6. A CRITICAL POLICY ISSUE

Annexure 1 is the policy adopted by the IARU Region III Association at the 1985 Auckland Conference.

Since then an issue has emerged that does require careful consideration. That issue affects the bands above 420 MHz and turns on whether it is better to continue to seek larger shared bands, or to now seek smaller exclusive segments, perhaps centred on amateur satellite bands.

There is an argument that the present approach gives flexibility.

However, in favour of the possible alternative approach, is the argument that the amateur is being disadvantaged and band segments are being eroded.

Among other matters, to support that position, reference is made to:

420 MHz	SLYDES	World-wide
420 MHz	MOULD	UK
420 MHz	VHF Radar	USA, UK, Europe
1.2 GHz	Windshear Radar	USA, Canada
1.2 GHz	Aviation Radar	USA, Australia
2.3 GHz	MDS	Australia

It is suggested that the adoption of a policy in respect of this matter, if different from the present IARU position, is a WIA policy to be taken to the IARU Region III Conference in Seoul. If not adopted there, or subsequently by the IARU as a whole, it is not a policy to be advanced nationally, and contrary to IARU policy.

7. RECOMMENDATION

It is recommended that the WIA consider the following issues raised in this paper and resolve to:

1 Review its policy in respect of frequency allocations to the Amateur Service, and
2 Advance that policy (whether amended or not) generally to the IARU, and particularly at the Seoul Conference of the IARU Region III Association, and
3 Subject to its review of the policy ultimately adopted by the IARU, participate in the national preparation for any frequency Conference, including preparation undertaken by the CCIR, taking positions consistent with the position adopted by the IARU, and
4 Seek the IARU Region III Association to nominate effective representatives as members of an IARU observer delegation to a Conference, and
5 Seek the accreditation of one or more representatives of the Amateur Service as members of the Australian delegation to a Conference, and
6 Establish the means of adequately funding the participation of the WIA in the forgoing.

David A Wardlaw
Michael J Owen

Members of the Federal Executive
January 16, 1988

L C T A New Transmission System

Peter J Cox PA3DSX
Malvert 68-51, NL-6538-ER, Nijmegen, Netherlands

LCT (Low Cost Transmission) makes it possible for computers to "speak to each other" using an inexpensive "modem" for your transceiver.

This modem (Figure 1), is designed for the C-64, but can be used with any computer having a data cassette I/O facility.

TRANSMIT MODE

Only two resistors (R1 and R2) form the basic modem between the computer and the microphone input of your set, making a perfect data signal transmission possible.

RECEIVE MODE

The received signal is taken from the loudspeaker direct to a fixed audio level CA3130 IC amplifier, inverted by a 1/4 4001, after which the "data" is sent direct to the computer. At D4, some more level conversion may be required on some computers.

PROGRAM

The LCT does not require any computer knowledge. Transmit/receive is accomplished without any special programs.

To exchange data, follow these procedures (considering the "local" commands for your computer, it may be advantageous to see a C-64 owner and find out what these commands do. I have been told that my old, trusty Model i, should have no problems — VK4QA).

SAVE(RETURN). .press switch S1

simultaneously, as arranged on air, the other station will:

Press LOAD(RETURN). . .press switch S1

The data contents can be anything, for instance CW exercises, printer commands, usual home-brew programs. Technically, LCT will be able to transfer any sort of program.

In practice, the F1 key was sufficient to prepare my computer/transceiver for receive.

TECHNICAL ASPECTS

During data transmissions, point D6 (sense) is automatically earthed through ports 3 and 4. These parts are sufficient to ensure "load-error-free" data transfers.

So, why the other parts in the circuitry?

1. C1 and C2 isolate the computer and transceiver.
2. Port 2 is excess. You may use it to connect a speaker or LED across it for monitoring purposes.
3. Z4 (Zener diode) keeps static charges from the computer.
4. The yellow LED is switched in by the computer during a LOAD or SAVE command.
5. C=80 uF prevents RFI destroying ports 3 and 4 of the memory. It did happen with one particular set.
6. S2 replaces the datasette "PLAY-key", enabling automatic start after "found name" on the screen.
7. The purpose of the fifth order filter is to chop off the many harmonics from the computer's square wave signals. Application depends on the sensitivity of your set's microphone input. R1 should never be of a lower value than indicated. It is preferable to try and feed the computer signal into the transceiver after the first microphone amplifying stage. This will also enable you to use the microphone without plugging/unplugging.
8. The transistor and reed-relay in the circuit diagram after "X". With this circuit you will be able to automatically control a cassette deck motor. The existing datasette is then not needed. On the reverse side of my PCB a five-pin plug is mounted and this will connect, for instance, a stereo deck with a four hour tape at 4.5 cm/sec. This makes it possible, with turbo loading and with an average program length of 30 seconds, to store more than 1500 programs on the one tape. This system will not work with cassette decks with automatic volume control, the signals will be corrupted.
9. The incoming signal must be at least 900 mV PP, pot P1 is then 40 percent open. The signal strength may be measured with the help of a simple S-meter during the incoming header-tone.
10. The print (lay out not shown) is about 40 x 40 mm and is soldered to the six-pin plug of the datasette. Through this print the computer, transceiver and cassette deck are permanently earthed.
11. A signal, being 10 percent too low, creates a bigger problem than too high signals. The incoming square wave signals are not "filled-in" properly causing corruptions.

NB: Do not deviate from the indicated values

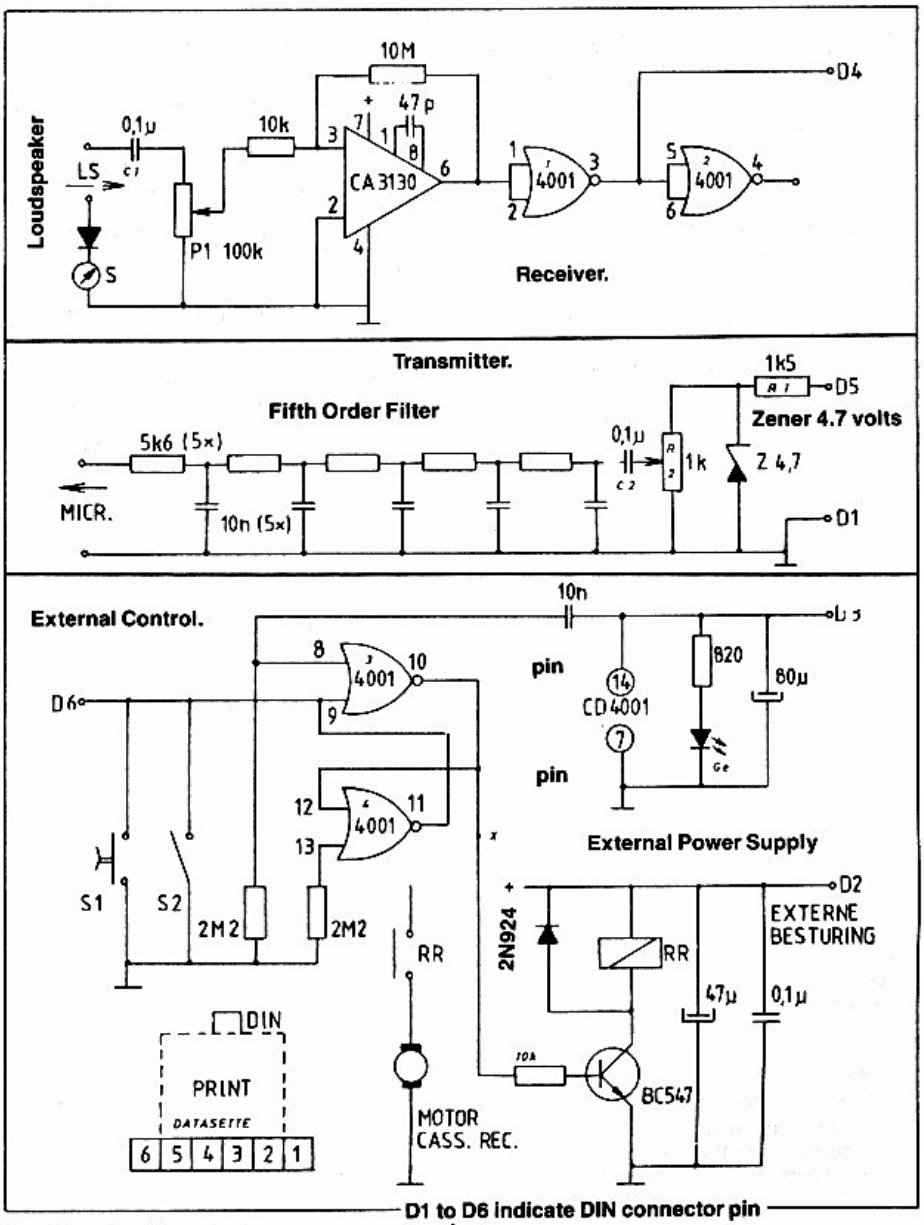


Fig. 1 Low Cost Transmission.

Please turn to page 29

THE BUG HUNT

Gil Sones VK3AUI
30 Moore Street, Box Hill South, Vic. 3128

This is a story of the hunt for a bug on the VK3REC repeater on January 13 and 14, 1988. Hunters were VK3GJ, VK3JH, and VK3AUI.

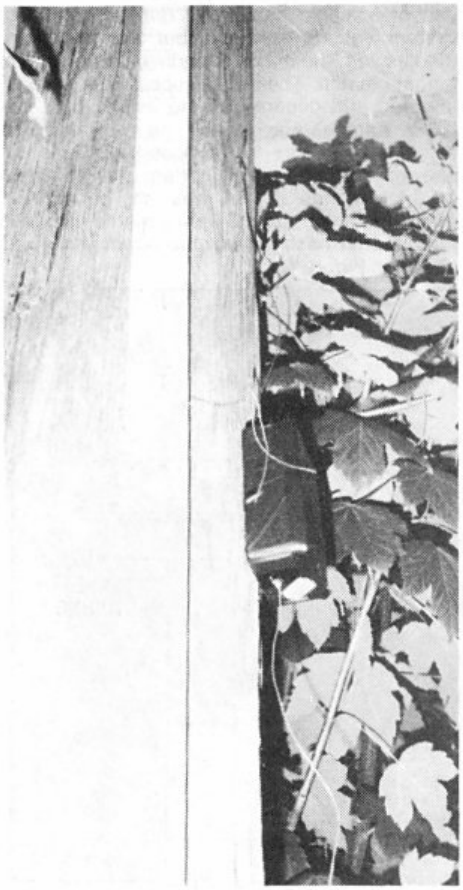
Summer brings out a great variety of insects which flourish in the good weather and the long balmy nights. Many a pleasant occasion has been marred by the insects which flock to the light.

Amateur radio unfortunately has its share. Nets and repeaters act much like the light at the barbecue. Pests flock to enjoy the attraction in their own way.

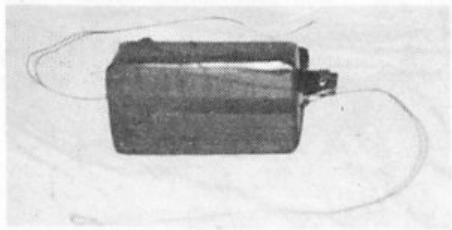
Recently a local repeater began to act in a rather strange manner. The maintainer of the repeater observed the strange way in which the repeater was acting. He came to the conclusion that a bug had been planted on the repeater, and the repeater was closed down immediately.

By way of explanation, a bug is a device which is placed maliciously to interfere with the operation of the repeater. It is usually a small device which transmits a signal which mimics a fault on the repeater or alternatively interferes with the operation of the repeater.

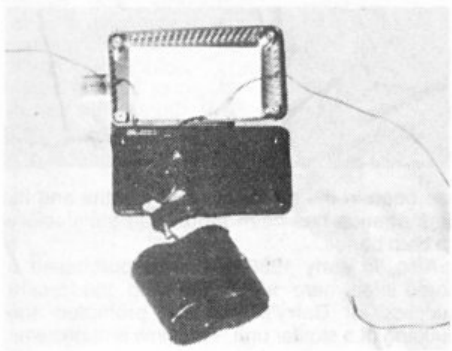
After closing down the repeater a group of fox hunters was organised to go and search for the bug. Some expertise in finding hidden transmitters is useful. However given enough time even the most inexperienced will find the bug.



The Bug Exposed.



The Device after removal.



Internal View of the Bug.

The fox hunters assembled with a variety of equipment and set out to search the area around the repeater. A fairly simple field strength survey narrowed the area down. A fairly intensive search soon led to the discovery of the bug.

A field strength survey is the simple technique of looking for the area of greatest signal strength. Move along a straight line or along the road and take note of the signal strength. Then do the same but at right angles to the first line so as to find the area where the signal is strongest. After a few false starts you will have localised the signal to a small area. Murphy will always send you off in the wrong direction at first.

Now the real fun starts as the signal is much stronger. You may have got by so far with nothing more than a hand-held transceiver but now the signal is embarrassingly strong. You may get further by various means of reducing receiver sensitivity such as tuning off the signal or removing the antenna and relying on leakage. Keen eyesight should not be underrated in the final stages.

A directional aerial or beam together with a gain controlled receiver and an attenuator is a great help. However do not think that such sophistication is mandatory. In this case whilst a beam was available and was used, the intelligent use of a hand-held and keen eyesight led to the discovery of the bug.

Following removal of the device the repeater was switched back on and returned to service.

The bug was passed on and examined for any clues as to its source. Hopefully the repeater will continue to give good service without further incident.

Finally, I would like to acknowledge the efforts of the other members of the team. Whilst they are not named their work has been greater than that of the writer.

ar

CANBERRA AIR PAGEANT — VI88ACT

On Sunday, March 13, Canberra will host a large air display and amateur radio will play an active part. The WIA (ACT Division) will provide on-site VHF communications to assist with the smooth running of the Air Pageant. Also, the special call sign, VI88ACT, will operate portable from the Canberra Airport.

VI88ACT will be the Division's station for the John Moyle Field Day over the weekend of March 12-13, and will be hoping to achieve honours for the ACT Division this year as well as to promote interest in the Australian Bicentenary. VI88ACT will try to operate as much as possible on the following frequencies: 3.588, 7.088, 14.188, 21.188 and 28.488 MHz.

VI88ACT OPERATION

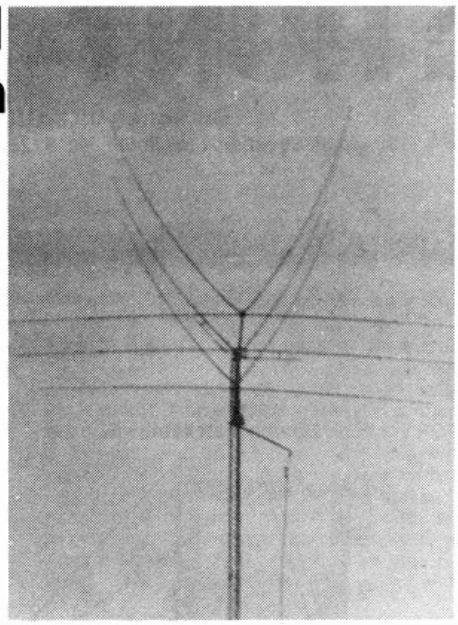
During January 1988, the National Capital's Special Event Station, VI88ACT, made over 1000 contacts, including 70 countries, and over 400 different prefixes.

On Australia Day, January 26, nearly all of the VI88 prefixes met on 14.188 MHz at 0900 UTC, in recognition of the Bicentenary. The following VI88 stations were on the air simultaneously: VI88ABC, VI88ACT, VI88NSW, VI88NT, VI88QLD, VI88SA and VI88WA.

THE DELTA-YAGI . . . a solution

The captivating Delta-Yagi!

M Glisson VK2JMG
7 Hely Avenue, Wagga Wagga, NSW. 2650
Barry Gilmour VK2MUZ
58 Tobruk Street, Wagga Wagga, NSW. 2650



IN THESE DAYS of sharply increasing prices this form of duo-band antenna yields good performance for the monetary outlay involved. The band combinations only to be limited by the strength of character of the builder. The basic design is non-critical in terms of variance of the basic design and available building materials. Several different forms have been built by the co-authors, utilising different construction techniques and basic antenna design. After 12 months of comparison between two similar forms of this antenna, antenna performance appears equal. They therefore conclude that this antenna provides a dual band capability with good performance without a considerable monetary outlay on an interlaced or trapped antenna system.

INTRODUCTION

In 1983, VK2JMG (ex-VK2KMG, VK2NIB and VK3NIB), moved from Melbourne to Wagga Wagga and traded a small inner city flat for a large suburban block. At last he had somewhere to contemplate an *antenna farm*. In researching back-copies of AR, an article by VK2VPN entitled *Delta-Yagi* was found (November 1980). This article described how a Delta-Yagi had solved his problems.

In VK2JMG's case, he had acquired a four-element 10-metre Yagi and had a desire for 15-metres, a fascination with quads and limited finance. The Delta-Yagi seemed perfect and a two-element Delta Quad was constructed to share the same boom as the 10-metre Yagi.

Performance of both antennas was good, in comparison with other local stations using more power (better than the FT-7 used by VK2JMG), and trapped beams, a DX station's report would be comparable and occasionally greater. The size of the 15-metre Delta Quad was enormous on the ground, but relatively "small" in the air. The latter illusion led to neighbour acceptance quite quickly. The wind survival factor initially was of great concern. A technique of parking the array into the prevailing wind allowed the antenna array and lightweight rotator to easily survive winds that tore trees apart! This form of antenna had certainly captivated VK2JMG.

Barry VK2MUZ, gained his call in mid-1986, and had been previously been involved in helping to erect and adjust the Delta-Yagi arrangement at the VK2JMG QTH.

This antenna was also to prove a fascination and upon gaining his call he decided to build a 15-metre Yagi, and 10-metre quad version, each of three elements.

After exhaustive research on pricing components, it was decided the best overall value for money was to purchase a commercially manufactured beam for 15-metres and construct the quad himself. Subsequently, a 15-metre beam was selected which has proven performance. Importantly, it also has a boom large enough to support the three-element quad without added extra support.

The Delta-Yagi was constructed and the entire cost remained far below that of a trapped or interlaced commercial array. This antenna has been in the air for over 12 months and its performance has been more than satisfactory on both bands.

Also, in early 1986, VK2JMG purchased a home elsewhere in Wagga and the recent success of Barry's antenna prompted the building of a similar unit. This new antenna was significantly lighter in gauge due to materials available. The construction techniques varied to accommodate this aspect. As the two antennas were similar in design, comparison in friendly competition was undertaken. The two systems are the same height above sea level and, after 12 months, the results gained are similar. This leads to the conclusion that the Delta-Yagi system is fairly non-critical in terms of basic constructional techniques and provides reasonable performance for monetary outlay.

The rest of this article will describe the basic antenna design, and constructional variations as used in the two forms of the antenna built. It will outline aspects which are found by experience which will hopefully stimulate constructional activity with this form of antenna array.

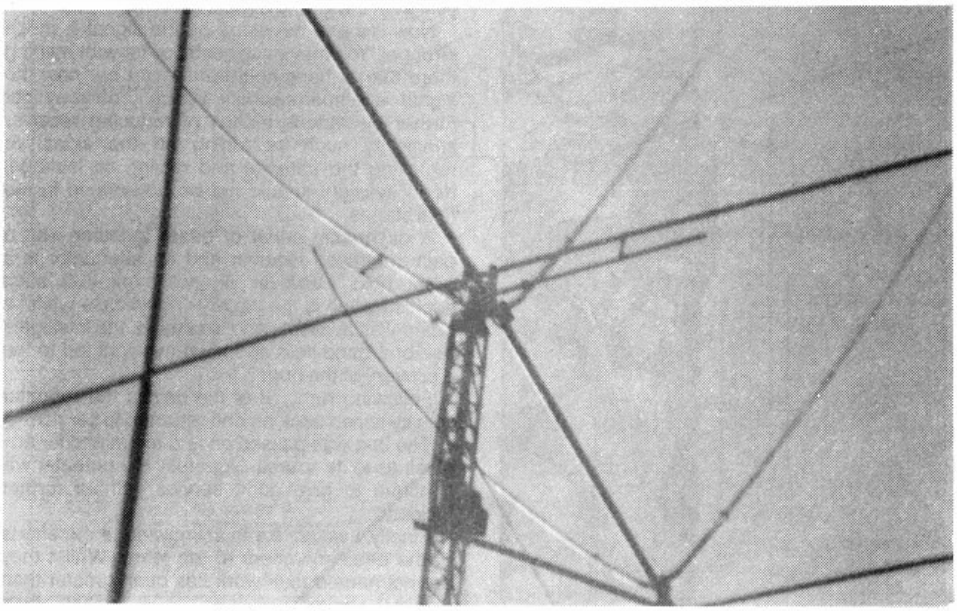
CONSTRUCTION

General — A three-element 10-metre delta quad over a three-element 15-metre Yagi. The three-over-three arrangement appears to be the best all round compromise in terms of performance, size, cost and mechanical balance for this type of antenna. On 10-metres, the three-element quad provides a similar gain to that of a four-element Yagi. On 15-metres, the three-element Yagi provides satisfactory performance without being excessively large. Both antennas theoretically have more than satisfactory front-to-back rejection ratios which show in the finished product.

Figure 1 shows the general form of the antenna with theoretical dimensions and a table of dimensions as used in the two basic forms constructed. These should serve to assist the would-be constructor.

The following notes will generally aid the constructor. These will be followed by specific details of the quad spreaders and variations, as well as the effects observed in the two delta quads built.

The delta quads are all "plumber's delight" constructions! A separate coaxial cable was used in both models to feed each antenna. The use of a single cable and remote switching system sounds attractive but has not been tried as yet! The match to each antenna is via a gamma match. The sliding-tube-type is recommended and dimensions are available in the *ARRL Antenna Handbook*. The two matching sections need to be opposed. Experience showed that a radiation pattern slew resulted on both bands if this was not done. The 10-metre match and 15-metre match are best mounted on each side of the boom centre as shown in Figure 1.



Delta Yagi — note the opposed Gamma Matches.

If a sufficiently heavy boom is used for the Yagi, the added quad elements do not necessarily need further support. However, if an overstay is required, ensure a good quality long-life Ultra-Violet resistant marine rope is used. A wire broken into what was thought to be non-resonant lengths, caused havoc with the tuning of the quad. Replacement with a non-conductive rope cured the problem. The vertical support for the boom should also be a non-conductor. PVC electrical conduit is ideal. (See Figure 2).

Another important point concerning this antenna is that it has height, width and breadth. It can therefore become difficult to manipulate or move about. By experience, once the delta loops begin to rotate, a massive torque is felt by anyone trying to hold the boom. (See Figure 3).

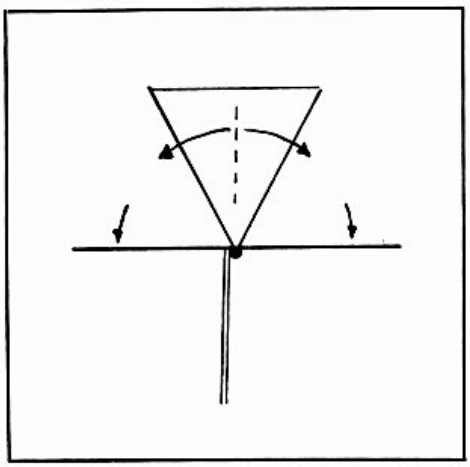


Figure 3a: Mounted on the Mast. Stable rotational effects are even.

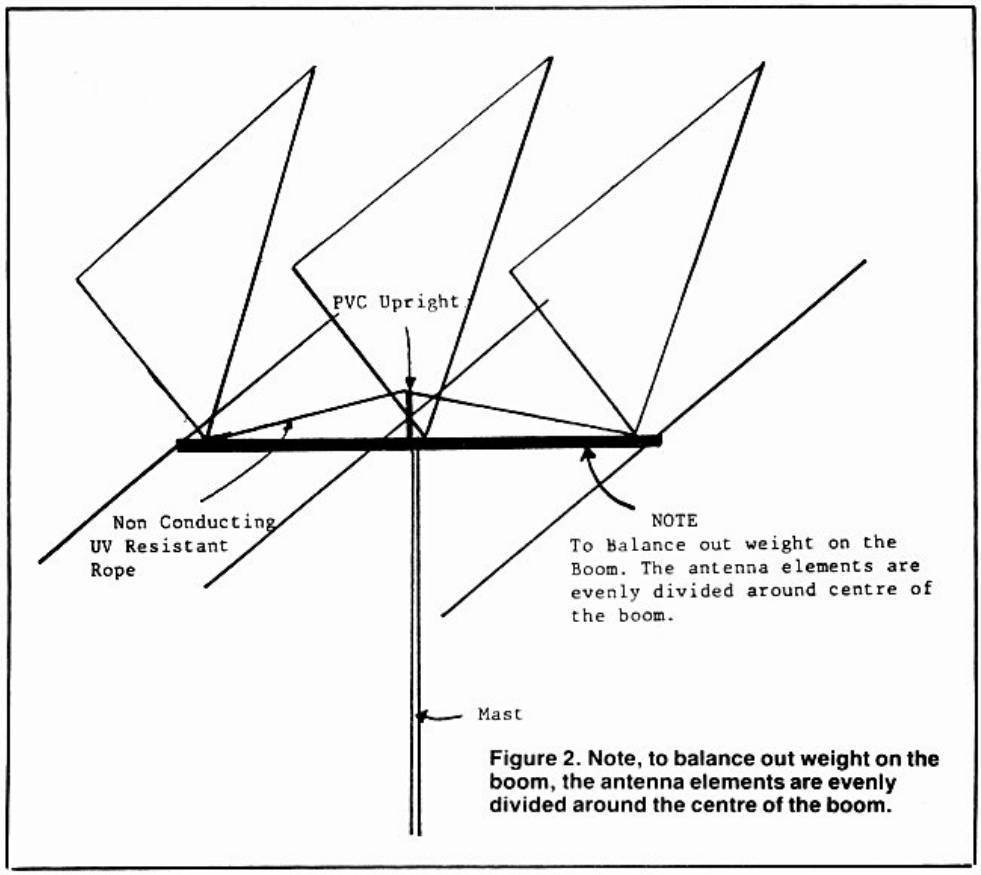


Figure 2. Note, to balance out weight on the boom, the antenna elements are evenly divided around the centre of the boom.

It requires two people to move the array about on the ground, although once the structure is mounted firmly on the mast, and the loops balanced, it is quite stable and capable of withstanding high wind loadings.

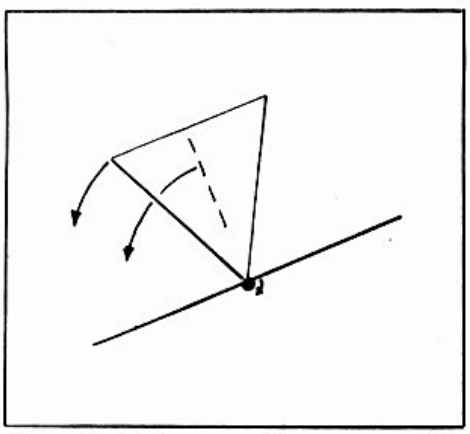


Figure 3b: During assembly or movement to the mounting point can be potentially difficult. It requires two people to safely manipulate.

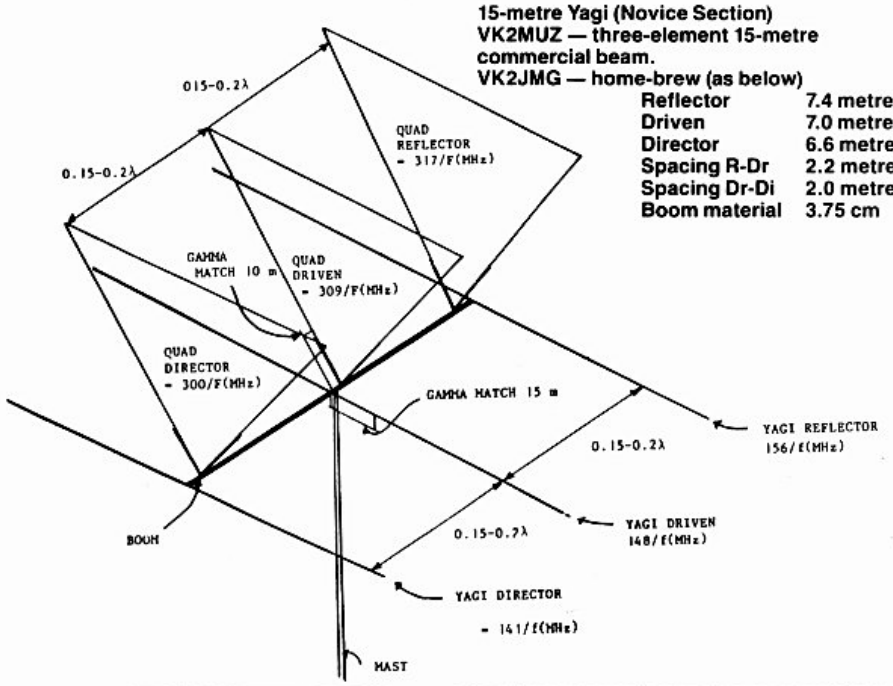
Figure 1. (All theoretical values derived from *The ARRL Antenna Handbook 1977.*

Dimensions:

Delta Quad	**Reflector Loop**	**11.12 metres**
	Driven Loop	**10.84 metres**
	Director Loop	**10.52 metres**
	Spacing R-Dr	**1.9 m/2 m**
	Spacing Dr-Di	**1.7 m/2 m**

15-metre Yagi (Novice Section)
VK2MUZ — three-element 15-metre commercial beam.
VK2JMG — home-brew (as below)

Reflector	**7.4 metres**
Driven	**7.0 metres**
Director	**6.6 metres**
Spacing R-Dr	**2.2 metres**
Spacing Dr-Di	**2.0 metres**
Boom material	**3.75 cm**



Tuning the Antenna — The 15-metre Yagi is assembled without the delta quad. Connect it to the length of coaxial cable to be used for 15-metres, point the director to the sky and adjust the match for minimum VSWR. (It was found that this adjustment remained fairly constant even after the delta quad was added and the structure raised to final height). The delta quad elements are then added, careful design will allow the constructor to mechanically balance the array around the mast mounting point. It is suggested that carpenters' horses or similar be used with G-clamps to hold the Yagi secure during mounting of the quad elements. Alignment of the delta loops can then be made — it is easier at this height!

Tuning the quad at this stage is nearly pointless as the array is far too close to the ground. If the array can be raised to about four-metres, or so, above ground and the length of

Figure 4.

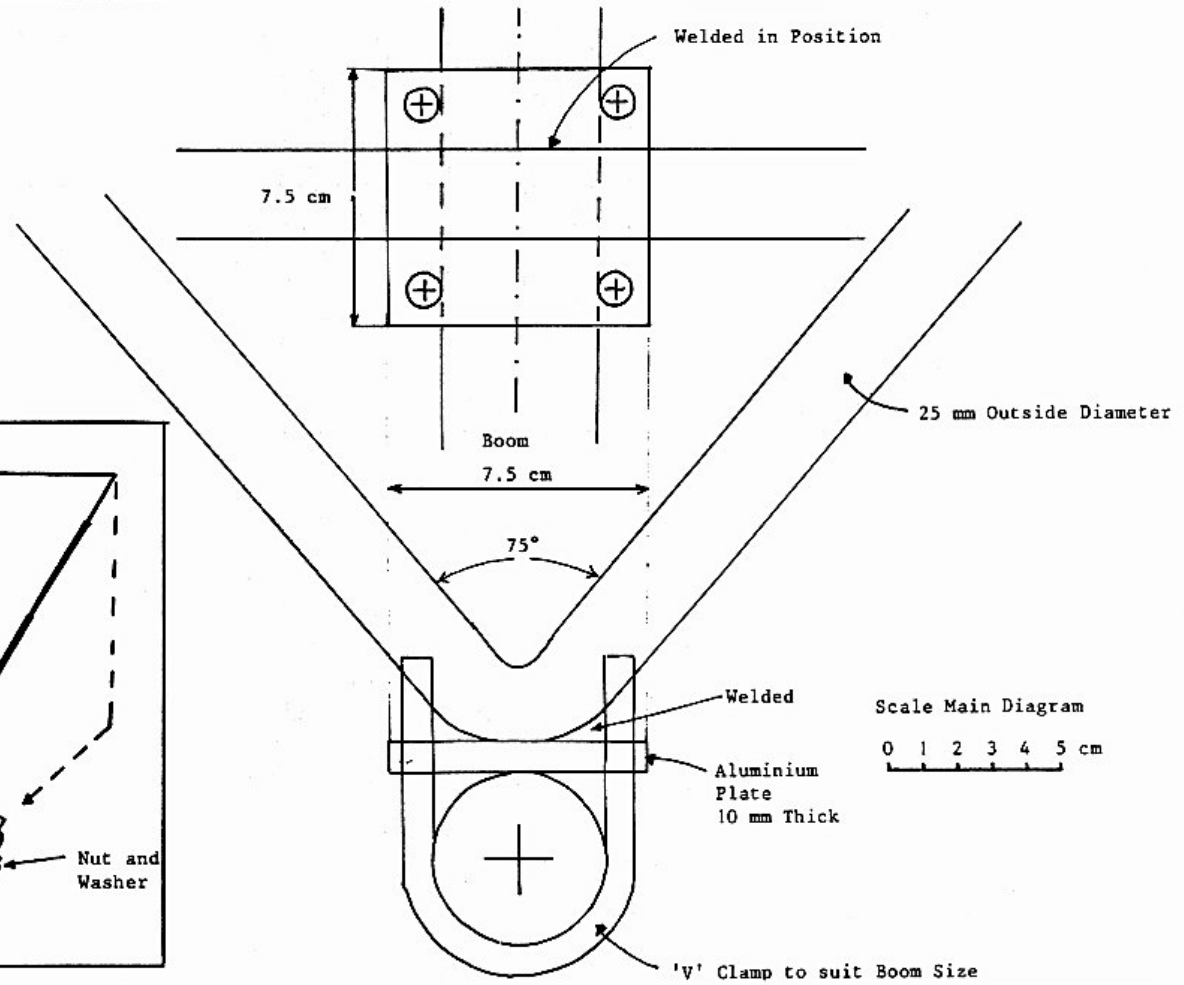
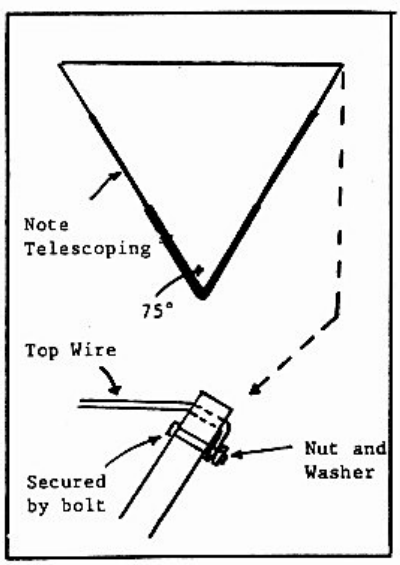


Figure 4a (Insert).



coaxial cable, to be used, attached, the VSWR adjustment will place the antenna in the "ball-park"! A touch-up will still be required when the quad is in the final position.

The method of mounting the boom to the mast must be substantial, a double clamp system to both mast and boom with a large aluminium plate is recommended. This is to negate any rotational forces exerted by the delta loops when side-on to a stiff-wind. Although wind survival of this antenna is surprising, it is recommended that, if a light weight rotator is used, (a light duty television rotator was used by the authors) the array should be parked with the director or reflector into the wind. This appears to even out any rotational forces.

Specific — It is assumed that amateurs who contemplate this design will have a 15-metre Yagi and a desire for 10-metre operation. If this is not the case, there are many good texts on the construction of Yagi antennas. If possible, ensure that the boom material is reasonably sturdy and the gauge in the walls of the tubing not too light or the quad loops will twist it over its length! (The authors tried and the wind beat them). Alternately, a commercial beam may be purchased and the delta quad added later.

The most important part of the delta loop is the spreader at its apex. Figures 4 and 5 show the two forms used. Figure 4 shows the spreader used by VK2MUZ, which is very robust as he has a very windy location. Note that the apex angle is approximately 75 degrees and two U-clamps are used. The aluminium has been bent by a pipe bender as it is hard-drawn tubing which is used as tie-down railing on a semi-trailer. The 75 degree angle was used by W6SAI and W2LX in their book *All About Cubical Quad Antennas,* and is consistent with the VK2VPN article.

The welded U extends 60 centimetres up each arm where aluminium of a lesser diameter slides in so as to extend it to the required length. The wire over the top is a length of hard drawn copper wire, about 14 gauge, which is connected as shown in the insert to Figure 4. The VK2MUZ loops are very sturdy and operate over a significant frequency range due to their relatively large loop tubing size.

Figure 5 shows the spreader used by VK2JMG. It is much lighter than the previous one and is similar to the original version described by VK2VPN in his article. However, corner reinforcements have been added and the apex angle is 90 degrees. The increased angle has been used to ensure the sides will tension adequately. They are composed of three lengths of telescoping aluminium tubing with the top diameter of only 1.0 centimetre. As a consequence, the loop has near vertical sides at the top. It is assumed, due to this, the antenna has an interesting response to local vertically polarised signals. This may also help with polarisation rotations during DX work as signals remain fairly constant during a "fading band". The VK2JMG loops are much lighter than VK2MUZ's, both mechanically and physically. This was necessary due to the 15-metre beam's lightweight boom.

In terms of frequency response, this quad shows a sharper response than VK2MUZ's, however this was expected!

Both delta quads, despite minor differences, show essentially equivalent gain with reasonable front-to-back ratios on the SSB portion of the 10-metre band. The interaction between bands is minimal. If listening on 10-metres and transmitting on 15, the "bleed-over" is no worse than two Yagis sharing the same mast.

CONCLUSION

Both authors admit to a fascination with this type of antenna design. The information presented has been distilled from a desire to understand and make a decent idea work! Further development work will continue to optimise the system as they research, experiment and learn more about the delta antennas. In the meantime, it is hoped this article will stimulate others to construct a Delta Yagi.

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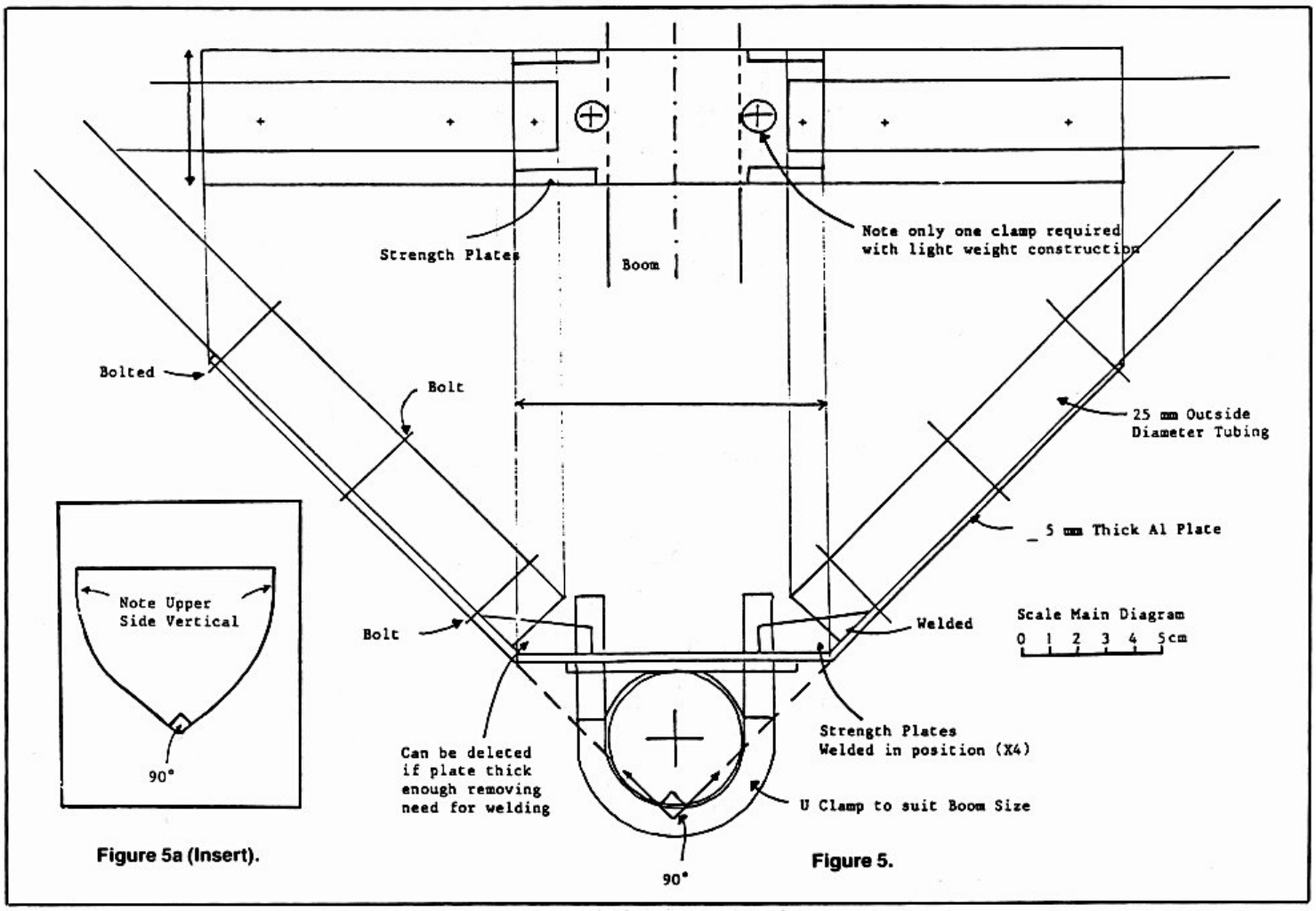

Figure 5a (Insert).

Figure 5.

Try This!

Gil Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

A SIMPLE IC22S CHANNEL LAYOUT

What about those new repeaters?

At last, I am the proud owner of the famed IC-22S, who now knows how many others have felt over this particular set.

It is a pity that the signal/RF meter did not survive the trip from VK4. A couple of pilot lamps would not go astray either!

I have been saving up all the circuits of modifications for weeks. It looks like too much work for such a little set though. I do not really need that extra box plugged into the back, nor those 80-odd channels. And scanning is for listeners, so that's out too!

Take a look at that matrix board. There are channels all over the place. It is a hassle unsoldering all those diodes without a desoldering tool.

I am only going to use the unit mobile on holidays and trips, so I really want something simple that I can memorise as I don't want bits of papers floating around when I am trying to watch the road.

I will just take a peek at the repeater listings in the Call Book and see what I am going to need. The following covers just about everything.

CHAN	FREQ	CHAN	FREQ
1	146.050/650	12	147.200/800
2	146.100/700	13	147.250/850
3	146.150/750	14	147.300/900
4	146.200/800	15	147.350/950
5	146.250/850	16	146.450
6	146.300/900	17	146.500
7	146.350/950	18	146.550
8	146.400/147.000	19	147.400
9	147.050/147.650	20	147.450
10	147.100/147.700	21	147.500
11	147.150/147.750	22	Rear Socket

What about those new repeaters?

Why not hook that D∅ line to a switch so that I can get 25 kHz up on every channel?

Check the circuit board and then run a wire from the nine-volt rail to the switch. Then run a wire back to the D∅ terminal on the matrix board.

Now, unscrew the channel knob and cut a neat little hole in the top corner of the plastic case. Put a small dab of super glue on the switch and slip it in there. You can hardly see it as it is so small!

Replace the knob.

Remember when it is pushed to the right means it is 25 kHz-up. A frequency readout is not necessary.

Now, memorise the list and you are ready for operation!

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THE SQUEAKBOX

An Audible Readout for the Amateur Shack

Leigh Harrison VK6WA
47 Mason Way, Padbury, WA. 6025

This unit was originally designed for a sight-impaired amateur to provide an audible indication of SWR in conjunction with an antenna tuning unit.

The unit uses a voltage controlled oscillator to give a very high pitch tone, proportionally to the voltage across the terminals of a moving coil meter. Calibration is achieved by setting "full scale" using a LED indicator. Once set up, the *Squeakbox* frees the operator from the need to look at the meter during tuning up.

However, it occurred to me that it might also be a very useful item in the shack for antenna adjustment, or any other application where a moving coil meter is used and not visible to the operator.

The Squeakbox connected directly to the meter terminals; the block diagram of a typical station set up is shown in Figure 1.

FUNCTION OF UNIT

This device has two functions:
it converts the DC meter voltage of an SWR bridge to an audible tone, and,
provides a visual indication (LED) of meter full scale deflection (FSD).

CIRCUIT DESCRIPTION (Refer Figure 2)

U1a forms a variable gain DC amplifier to raise the small voltage across the meter terminals to about 2V for FSD.

RV1 sets the DC gain, hence the RANGE of the amplifier.

U1b is connected as a comparator, the output of which drives the FSD LED via Q1. RV3 sets the point at which LED2 indicates the full scale reading of the meter.

U1d is connected as a voltage follower to provide a low impedance reference for U1a.

U1a output is connected to U1b and also provides the control voltage for Q2 and Q3 which form a voltage controlled multi-vibrator.

Q3 in turn drives Q4 which is connected as an emitter coupled switch to drive a small loudspeaker.

The speaker may be turned on or off via S1, the TONE switch.

The power supply consists of a standard pair of full-wave capacitor-input rectifiers for both positive and negative rails, formed by T1, BR1, C11 and C12.

U2 and U3 are fixed positive and negative five volt regulator ICs.

CONSTRUCTION

The prototype was constructed on a single piece of Vero-board and housed in a small plastic instrument box.

Layout is not critical, although wiring should be kept as short as possible to avoid RF pick-up by the unit.

The speaker used was a small 32 ohm headphone insert, however any suitable small transistor radio speaker will do.

The volume of the tone may be increased by lowering the value of R16 to no less than 56 ohms.

Do not reduce this value any further or the dissipation of Q4 will be exceeded.

A double pole toggle was used for the tone switch only because it was in the junk box; however, any single pole unit will also by okay.

PRELIMINARY CHECKS

Connect 240 volt mains power to the unit; the PWR LED should light. Check the positive and negative power rails for +5 and -5 volts respectively.

TESTING THE UNIT

Connect a short screened lead, preferably RG174/U or similar coaxial cable, from the SWR bridge meter terminals to the RCA connector on the rear of the Squeakbox (positive to inner conductor).

With no input applied, connect a DC voltmeter to U1a pin 1, and set RV2 to give approximately zero volts.

Next, ensure that RV1 is at minimum resistance and apply the input signal from the SWR bridge meter; positive to centre conductor of SK1. Set the SWR bridge for FSD reading and adjust RV1 to give about +2 volts at pin 1 of U1a.

Disconnect the input signal and switch on S1.

Set RV2 for most reliable oscillation at a high pitched tone (about +0.6 volts at U1a pin 1).

Next, apply the input signal varying it from zero to FSD. The tone should now decrease in pitch with increasing meter reading. RV1 may be set to get the greatest change in tone pitch for meter reading. The prototype was found to perform at its best at about +2.0 volts at U1a pin 1. Once satisfied with the VCOs performance, the FSD indication can be set. Adjust RV3 to illuminate LED 2 at about 95 percent of FSD. This avoids possible meter damage due to errors during calibration.

OPERATION

Set the SWR bridge to FORWARD and increase SET control until the FSD LED is just illuminated (equivalent to a full scale meter reading).

Turn the TONE switch on; a low pitched tone should be audible.

Set the SWR bridge to REV and the tone pitch should now increase.

Adjust the ATU for highest pitch, whilst keying the transmitter on and off, to compare minimum REV reading.

Turn the TONE switch off for normal operation.

IMPROVEMENTS

This unit was not designed with totally blind amateurs in mind, however it may be possible to use the device in this situation.

One fairly obvious change is required to the "full scale" indication by changing this also to an audio tone.

The easiest method is to incorporate a 555 timer to repetitively turn the VCO on and off at FSD. See Figure 3.

The 555 is held reset by Q1 until the FSD threshold of U1b is reached. At FSD the 555 is enabled and keys Q2 on and off at about 0.25 seconds.

Any technical inquiries may be sent to the address at the head of this article, enclosing an SAE.

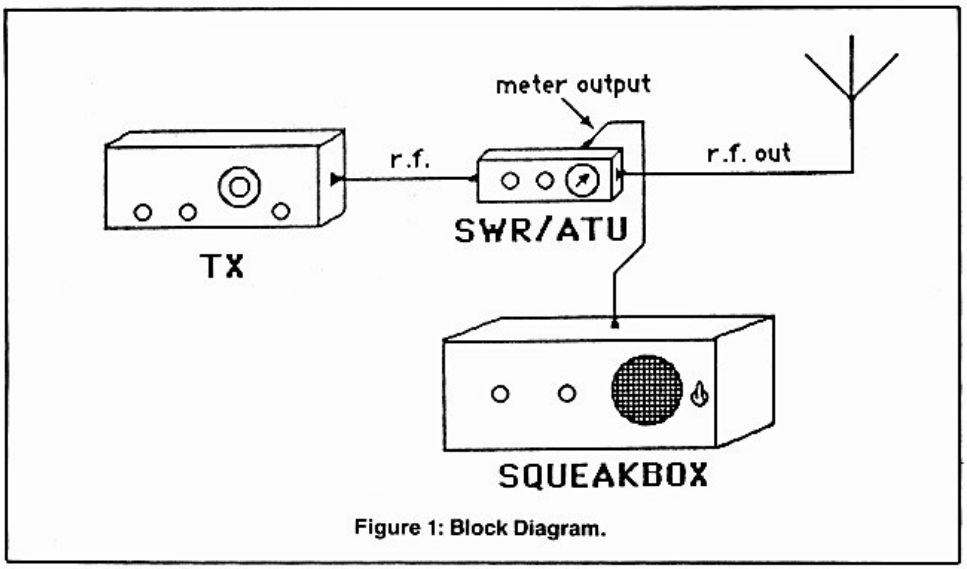

Figure 1: Block Diagram.

PARTS LIST

Capacitors

C1-5, 9, 10	100 nF 100V Ceramic
C7, 8	1 uF 35V Tantalum
C11, 12	470 uF 25VW Electrolytic
C13, 14	470 pF 5kV Ceramic
C15, 16	10 nF 100V Polyester

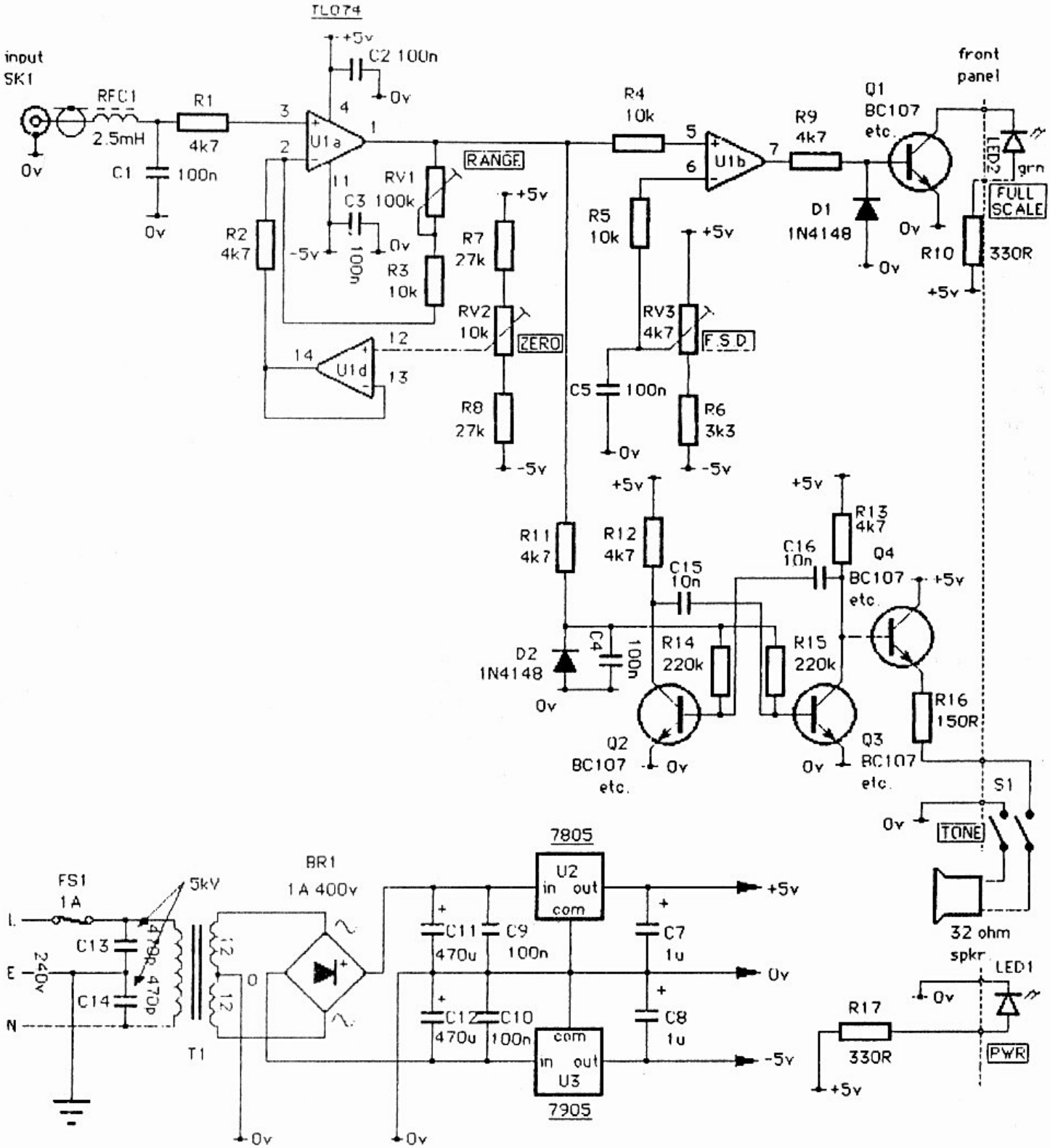

Figure 2: Circuit Diagram of Squeakbox.

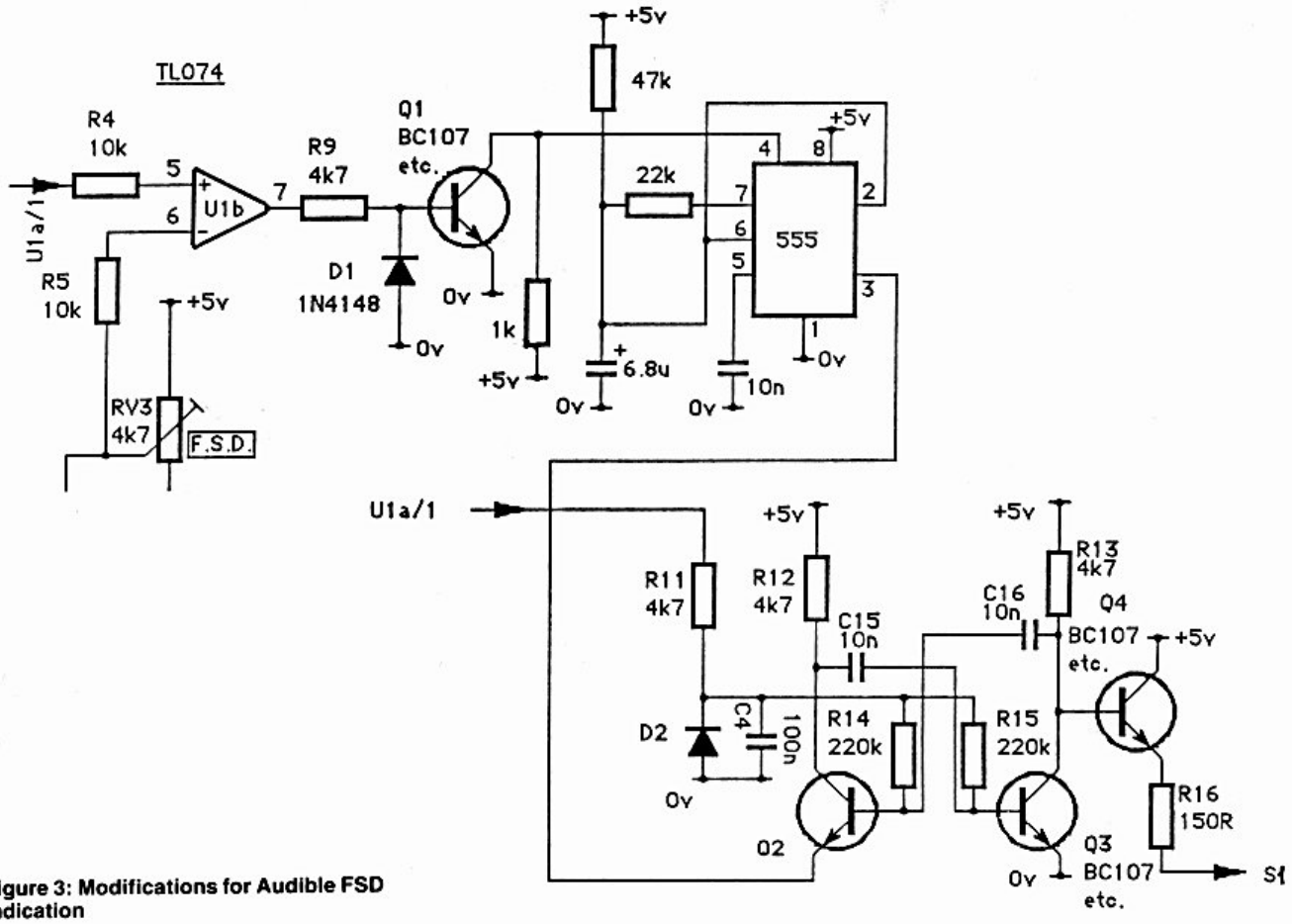

Figure 3: Modifications for Audible FSD Indication

Resistors (all resistors are ¼W 5 percent

R1, 2, 9, 11-13	4k7
R3-5	10k
R6	3k3
R7, 8	27k
R10, 17	330 ohm
R14, 15	220k
R16	150 ohm

Potentiometers

RV1	100k Trimpot
RV2	10k Trimpot
RV3	4k7 Trimpot

Semiconductors

BR1	Bridge Rectifier 400V 1A
D1, 2	1N4148
LED1, 2	Light Emitting Diode
Q1-4	BC107 etc
U1	TL074 Quad Op Amp IC
U2	7805 +5V Regulator IC
U3	7905 +5V Regulator IC

Miscellaneous

FS1	1A 20 mm HRC Fuse and Holder
RFC	2.5 mH RF Choke
S1	DPDT Toggle Switch (SPST will do)
SK1	RCA Phono Socket
T1	Mains transformer, 240 volt primary with 12-0-12 volt secondary

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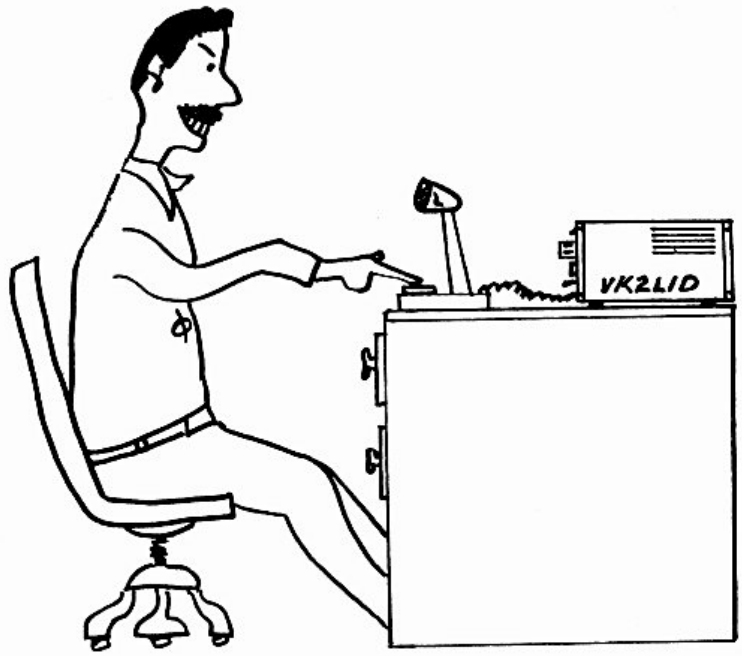


"I've got 1000 new QSL cards here — who's going to be the first? ! ?"
—VK2COP

EIGHTY METRE, FIVE WATT QRP TRANSMITTER

Rod Green VK6KRG
72 Yelverton Street, Bonnybrook, WA. 6239

Full band coverage. Full break-in. Very simple to net to your receiver frequency No clicks, chirps, whistles or bangs.

This little transmitter should have a wide appeal because of its many features. These have been incorporated whilst keeping cost to a minimum and include:

Full 80 metre coverage — 3.5 to 3.7 MHz using a very stable VFO.
VFO tuning can be restricted to any one portion of the band.
Full maximum output for QRP — five watts.
Only two presets need to be adjusted. This ensures good reliability and should suit novice constructors.
Four small, easily constructed boards. This brings versatility in that some boards will be common to all rigs designed by the writer so that 'standard boards' will become popular.
Full break-in is incorporated. That is, the receiver operates as the key is lifted.

OTHER FEATURES

As a cost-saving measure, no frequency readout is provided. It is necessary to net the transmitter to your receiver with the Netting Button. This puts an S1 signal into your receiver thus tuning the transmitter to the frequency at which you can hear the signal. Therefore, a calibrated receiver or crystal calibrator is needed. A frequency counter readout would raise the cost too much initially. To use a receiver is only a minor inconvenience. A frequency counter option will be made available soon.

If using an ATU, a very small frequency shift may be noticed whilst tuning the antenna resonance. This is due to the enormous impedance changes while tuning. This shift is frequency is in the order of 200 Hz and does not prove to be a problem. On-air stability after this tuning is excellent. The extra cost and the complexity to prevent this was not considered necessary.

Much care has been taken to eliminate spurious transmitter products such as key-clicks and TVI by the careful use of envelope shaping and output filtering. There is no compromise here as our very reputation as amateurs is at stake. Signal reports have never been anything but a nine for the last digit of an RST report and that is how it always should be.

Very fast reed relays are used for antenna switching because I found that diode switching caused TVI on my own nearby receiver. This could cause real problems for a novice to track down so it was found best to steer clear of that type of circuit.

CIRCUIT BOARDS

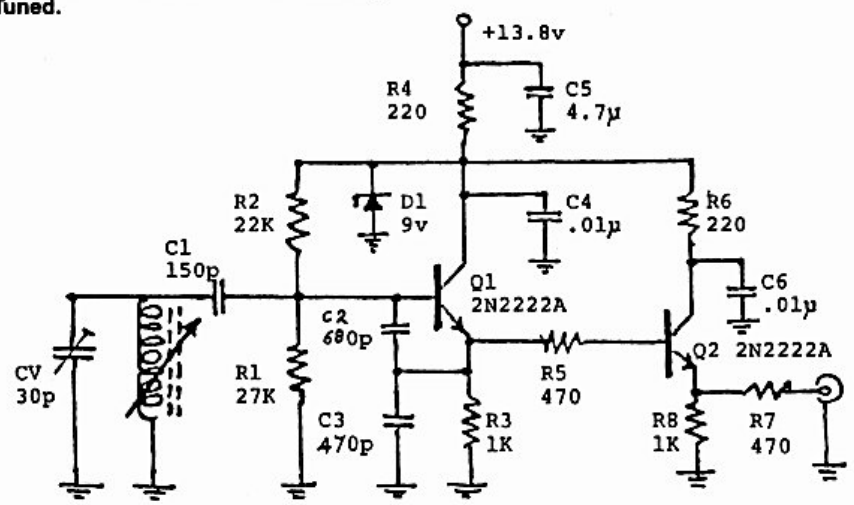
The VFO Board (See Figure D1). The lack of suitable variable capacitors has led to the development of this permeability tuner oscillator. It was found that most ferrite cores caused excessive drift due to temperature changes so that brass was then chosen. A brass rod instead of ferrite proves far superior for temperature stability. The brass slug is screwed in and out to change the frequency. A threaded brass rod is used here and extends from the inductor out to the front panel by the coupling shaft supplied in the kit.

Transistor Q1 is the oscillator. It is supplied with regulated supply voltage by zener diode D1. The oscillator is quite stable even if the supply voltage is not regulated. The emitter of Q1 feeds the buffer transistor Q2 via R5, which seems to improve oscillator frequency stability caused by changes in load capacitance. The output of Q2 feeds the next stage via R7 which was also used to reduce drift. All the important circuit voltages are listed in the appendix.

Buffer, Divide by 2, Timer Board (See Figure D3). This board is called the BDT Board from now. It employs two CMOS ICs and an operational amplifier as follows:
The output from the VFO feeds the input of this board. The first stage, IC1a, is set up as a low level voltage amplifier. This brings the oscillator RF level to about 12 volts peak to peak. The next two stages, IC1b and IC1c, add extra isolation. The VFO frequency is 7 MHz so it will not get into the receiver when you are listening. In this way, the oscillator can be kept running all the time which aids long-term frequency stability. From IC1c, the now square-wave signal passes on to IC2. This is a frequency divider dividing by two. Basically, it is enabled by the Morse key. When the key is DOWN, IC2 is turned ON generating 3.5 MHz at pin 13. When the key is UP, the divider is turned OFF and pin 13 reverts to plus 12 volts. There is, therefore, no 3.5 MHz when the key is up.

Although the key controls the operation of IC2, a delay is introduced such that after the key is lifted, IC2 continues to generate 3.5 MHz for a few milliseconds. The amount of time delay is controlled by the setting of RV1. Delay is necessary so that once the key is lifted the CW envelope shaping network around the RF final transistor does not instantly turn off the final but decays over a few milliseconds. To allow this to happen, the full RF drive to the final must be supplied until the RF envelope has completely decayed. If the final RF input to the final transistor was suddenly removed as the key came up, there would be nothing for the network to shape. The envelope would suddenly collapse causing severe key clicks.

Figure D1 — 7-8 MHz VFO Permeability Tuned.



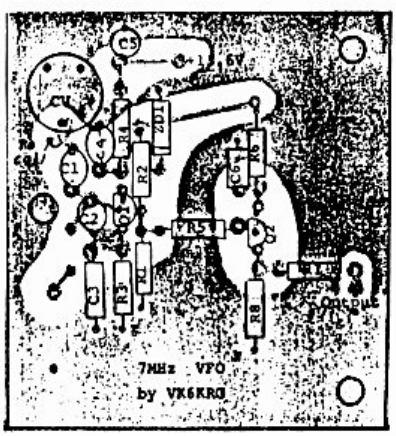


Figure D2 — QSK Board.

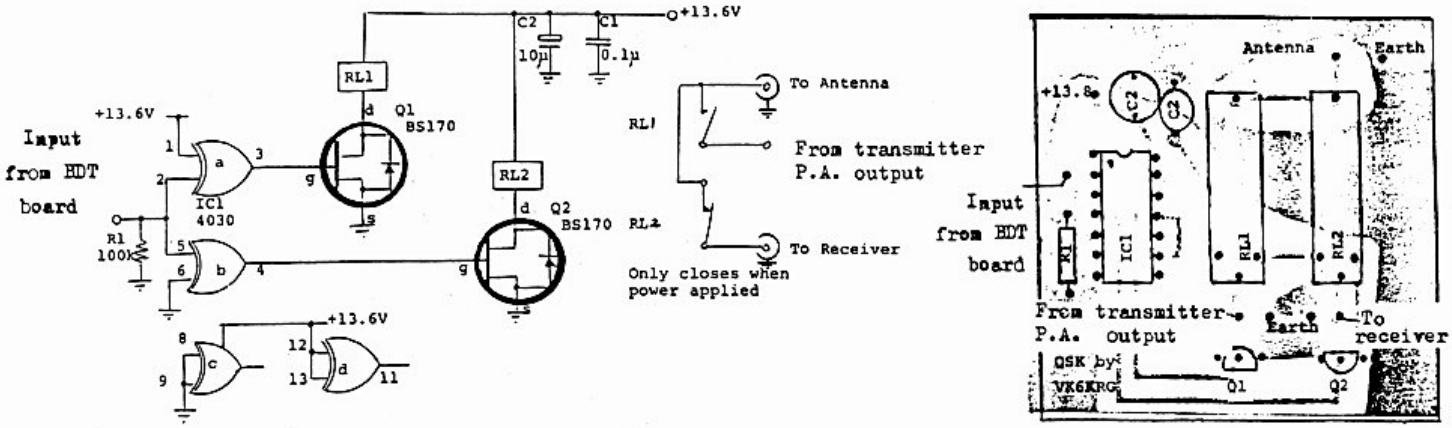
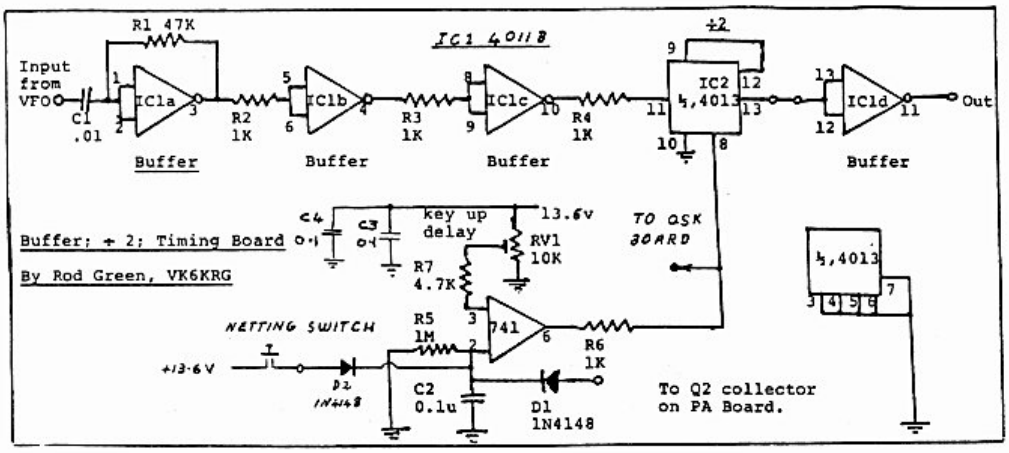
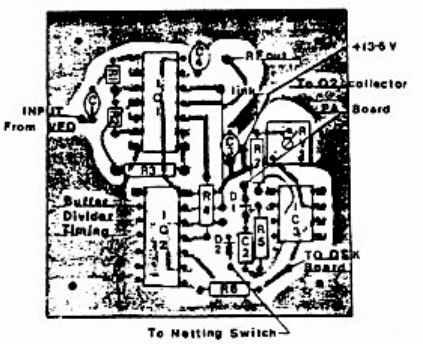


Figure D3 — BDT Board.





A further function of the BDT Board is to supply the netting signal mentioned earlier. It does this by turning on IC2 without keying the final. A small amount of this signal leaks into the receiver for netting.

Finally, the BDT board is not directly controlled by the key but from Q2 on the PA Board. This transistor is directly controlled by the key.

PA Board (See Figure D4). This board is also very versatile in that it can be used with other QRP transmitters. For instance, it can be directly fed from a well isolated VFO.

The signal from the BDT Board passes to IC1 via C1. Potentiometer R2 sets the operating point of IC1a. R2 has only little effect when fed from the BDT board, but when it is fed from a sine wave VFO, R2 then acts as a power control and can be set for any power level from 0 to 5 watts. This feature is dispensed within this model.

Capacitor C3 couples the signal to IC1c and R3 is used to ensure that transistor Q1 is turned off in the unlikely event of RF drive failing with the key down.

Transistor Q1 is the five watt final. L1, C7 and C8 form a matching network to convert the drain impedance of 19 ohms to 50 ohms. The remained of the inductors and capacitors to the right form the 50 ohm low pass filter. Transistor Q3 is the main keying transistor and is used in sequence with the key to gradually turn the final on and off. The time taken for the rise and fall of the RF envelope depends on the components of the envelope shaping network R6, R7, R8 and C5. Transistor Q2 is used to interface between the key and the envelope shaping network. This entire keying network has proven to be both simple and very effective. It will possibly be seen on QRP Club rigs in the future!

QSK Board See Figure D2). This board does the function of transmit/receive switching. With the key UP, plus 12 volts will be applied to the input. This turns ON Q2 via IC1b, relay RL2 operates and switches the ANTenna jack to the RECeiver jack. When the key is DOWN, IC1b turns Q2 OFF and releases RL2. At the same time IC1a turns Q1 on which operates RL1, thus switching the ANTenna jack to the TRANSmitter output on the preamplifier board. The input control voltage to this board comes from the output of IC3 on the BDT board and should be plus 12 volts for receive and zero volts for transmit.

CONSTRUCTION

Check all of the components supplied with each board. Check packs off against master parts list.

Notes for Constructors by Rev VK6SA, President of Peel Amateur Radio Club, VK QRP Club Member No 61 — Happy Assembler of Kit No 1.

Empty all components from small bag onto a dessert plate to ensure they do not get blown away or knocked off the table.

Sort the resistors. I write the numbers of the circuit resistors (R1, R2, etc) on a piece of paper, then make a hole at each position and insert the requisite resistor. This way it is possible to check them all before they are mounted!

Board 1 — QSK (Keying) Board (See Figure D2). Component positions are easily located. Take the relays first. These are little reed switches which are always in the open position without power. Mount them in position and solder.

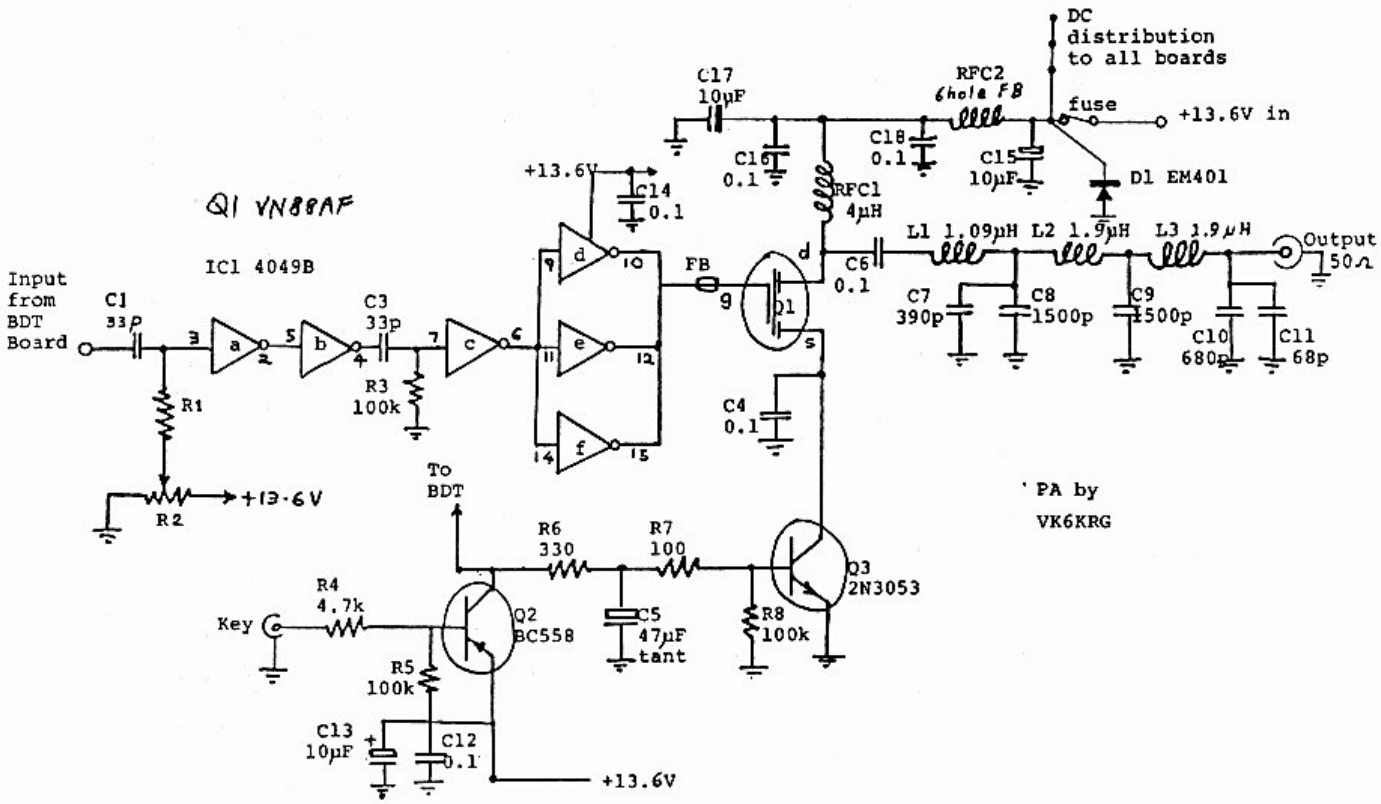
Mount the electrolytic C2 noting the polarity.

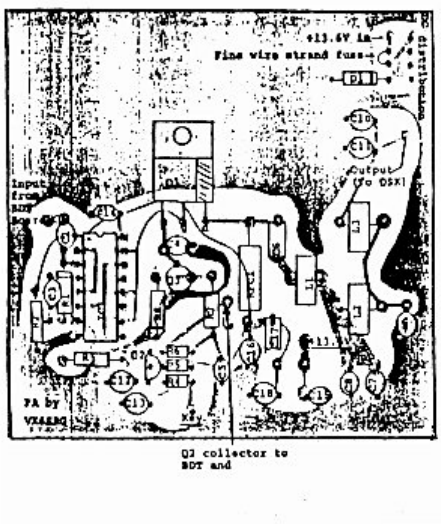
Mount and solder bypass C1 **before** placing the IC in position.

Mount IC4030 being careful that all pins go through the board. Solder earth pin 7 first. Then solder the +ve pin 14.

Replace completed QSK Board in plastic bag.

Figure D4 — PA Board.





Board 2 — VFO Board (See Figure D1). Sort, mount and solder resistors. Mount zener, noting polarity. The marked end points to the +ve part of the circuit.

Affix C1 and C6.

Mount Q1 and Q2. Do not have them sitting on the board but do not have the legs too long — the body about five millimetres from the board is ideal.

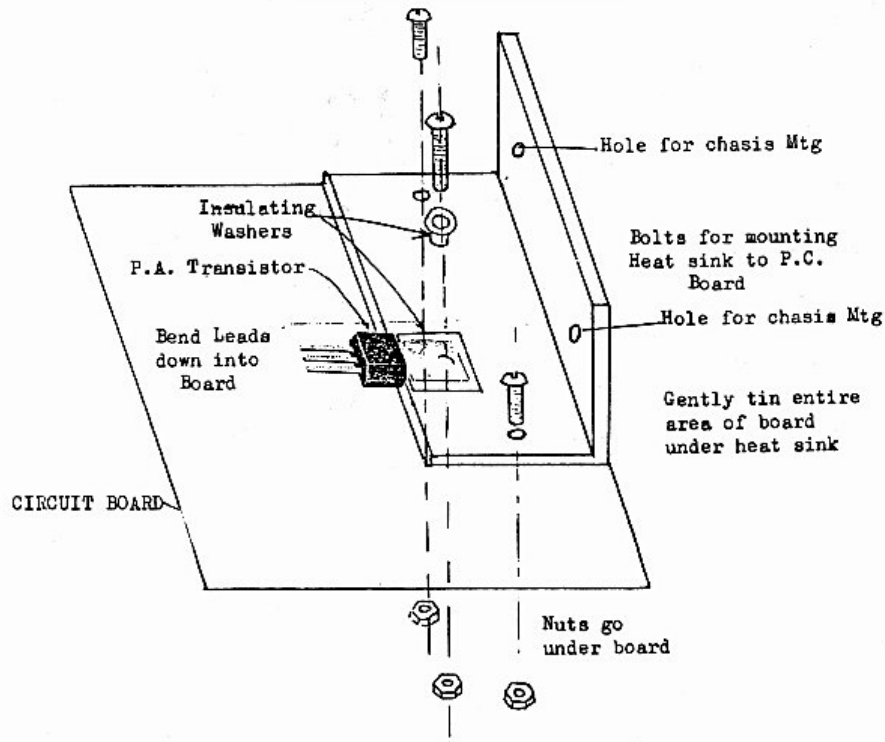


Figure D5 — PA Assembly.

Mount electrolytic C5 noting polarity.

Mount polystyrene (Styrocap) C1, C2, C3. Two need to be mounted on-end.

Mount trimcap, CV then replace completed board in plastic packet.

Board 3 — BDT, Buffer, Divider, Timer Board (See Figure D3). Mount R7 before mounting VR1. Position other resistors, solder and trim leads. Fit link.

Mount diode, then capacitors and replace board in plastic packet.

Board 4 — Power Amplifier Board (See Figure D4). Position heat sink alongside board edge. Drill holes and mount in position. Solder nuts to lower the earth plane of the circuit board.

Drill hole for Q1 and de-burr. Fine-sand the aluminium surface so that nothing can puncture the thin separating plastic transistor mounting membrane. Spread heat paste in position. Place plastic sheet and flanged washer in position. Insert ferrite bead on gate lead, bolt Q1 in position and solder.

Identify the circular wound toroid RFC1, 4 uH. Label an envelope, place RFC1 in envelope and put in a safe place. This component is not mounted until after the complete set is assembled and tested.

Mount the resistors, then the transistors. Sort the capacitors in a similar fashion as the resistors of the VFO Board. Some toroids may need to be mounted to help sort out the capacitor position.

Mount transistor Q3, then the IC. Remember to solder the earthed leads to both sides of the board.

Replace the completed board in the plastic bag.

ASSEMBLY

Using the template supplied, mark two dividers from the sheet metal. Cut the pieces slightly larger to allow for a six millimetre lip all round. This metal also solders nicely without bother.

Carefully read the Construction Notes. Drill all holes. Place dividers in position and firmly tack-solder the dividers in position in the tin.

Drill and enlarge hole in cake tin to take the tuning spindle for the VFO coil adjustment.

Solder 15 centimetres of small coaxial cable to each inlet, outlet or inter-board connection point on the QSK and BDT Boards, and to the key position on the PA Board. A very short piece soldered to an RCA socket is the VFO Board output.

Solder 15 centimetres of red-covered wire to the 13.8 volt position on each board, except the VFO. For 13.8 volts supply to the board, use a piece of heavy copper wire which must be well insulated where it passes through the VFO compartment divider.

Carefully label each coaxial lead so that misunderstanding of its other termination is impossible. Assemble all boards and loosely mount them in their positions in the cake tin.

A small dab of solder is required on each board where contact is made with a stand-off. Use a fine black felt-tip pen to make temporary marks. Such marks are easily removed. Carefully mark all plugs, switches and sockets.

Remove all boards, drill all holes and spot-solder the stand-offs positions. Paint tin if desired. Fit all sockets, switch, netting button and power inlet.

Replace all boards and cut-to-length all pieces of hook-up coaxial cable. It is most important that all wires curve around tidily. One day, it may be necessary to remove one board for maintenance. Solder hook-up leads.

TUNING — by Rod VK6KRG

When all boards are wired in position, except for the RFC1 of the PA Board, check the power supply line for shorts to earth. Assuming all is well connect 13.6 volts to the supply socket. The VFO should now be operating. Place a receiver in close proximity with its antenna lead to a pick-up loop adjacent to the transmitter VFO. Wind the coil tuning slug to the outer position.

Set the receiver to exactly 7.000 MHz and adjust the trim-cap on the VFO Board until a beat-note is audible. This completes the VFO adjustment. Wind the tuning knob such that the slug is about halfway into the coil. The exact position is not critical.

Adjust the receiver to half the current VFO frequency. Insert the key into the socket provided. Depress the key and again tune the receiver for a beat-note. The antenna pick-up loop should be close to the BDT Board now. Adjust RV1 on the BDT Board until such time that, when the key is lifted, the beat-note will still be heard for a very short time.

The exact time is not critical but it must be there. A quarter-second is about ideal. This completes the BDT Board adjustment.

PA Board. With key down. If a high impedance DC volt meter, 20 kohm/volt or better, is available measure the DC voltage at the PA RF input. It should be about six volts ± one volt. Adjust R2 to get 6.8 volts at the junction of R1 and R2. Alternatively, adjust R2 for half rotation. The next check is very important.

With key up there should be zero volts DC on pin 15 of IC1. If this is not the case under no circumstances insert RFC1 on the PA Board as this would ensure instant destruction of the final transistor on key down.

Now, depress the key and again measure the DC voltage on pin 15 of IC1. It should read about six to seven volts. This is a sure indication that RF is being fed to the final.

FINAL CHECK

Disconnect the power and solder RFC1 in position. Insert a zero to one amp meter in the supply. Connect a dummy load to the antenna jack and connect the power. With key up all components should remain cool and the ammeter should read less than 100 milliamps.

Depress key and the current should rise to a value between 500 and 700 milliamps. Five watts is the optimum. If the output is low, say three watts, and DC current is less than the maximum recommended above, some power can be gained by adjusting R2 such that the DC voltage at its wiper increases. Just ensure that it does not exceed 700 milliamps. Conversely, if the current is near 700 milliamps, reduce current by winding R2 in the opposite direction. The optimum is five watts with 650 milliamps.

CHASSIS PREPARATION AND CONSTRUCTION

Using the paper template supplied cut flat plates from sheet metal to match templates. Mark the hole positions with a centre punch before cutting to ensure that, in the event of template damage, the hole positions are still marked. If desired the templates can be glued to the metal with a glue-stick.

Drill holes, and solder partitions in box — flux purchased from a hardware store will assist. Note placement positions on diagram.

Drill a small hole in the front wall of the chassis to line up with the axis of the coil. Check by temporarily mounting the coil and pass a knitting needle through the hole. It should pass through the throat of the coil. If not; file the hole slightly to move the centre before enlarging the hole to take the particular spindle bushing supplied.

Place the BDT Board on the side wall of the chassis with its input side closest to the VFO partition. Place the board on the outside of the chassis to mark the hole positions. Drill (⅛).

Place the QSK Board on the bottom (which will become the top) and mark the hole positions. Drill. The PA Board is mounted by it's heat sink on the narrow wall of the chassis.

Ensure that the QSK Board does not foul or is mounted too close to the chassis opening. Remember, the bottom plate will need to be mounted without fouling the PA Board — and it will be on a slope.

Mark and drill holes for switch, power, netting button, antenna, receiver and key sockets.

Drill 10 holes around the chassis lip to accommodate the base-plate. Solder nuts to take the bolts coming through the base-plate. Thoroughly remove excess flux so that paint will adhere to the surface. Affix first set of labels before painting. Paint. Remove first set of labels. Apply clean set.

GENERAL NOTES

● This symbol indicates sockets on chassis.

Use supplied coaxial cable for joining: BDT output to PA input; PA output to QSK Board; from chassis receiver socket to QSK Board receiver tag; antenna socket to antenna tag on QSK Board; VFO output to RCA socket on partition wall; VFO socket to BDT Board.

Remember to earth the coaxial braid at each end. Sometimes there are holes provided for this. At other places, the cable enters a board near the edge in which case the braid may terminate at a convenient place under the board.

The following components are mounted on end (as in small transistor radios):
BDT — R1, R2, D1, D2.
VFO — C1, C2.
PA — R4, R5, R6.

Solder both sides of the PA Board where components are earthed.

All components overlay drawings are shown from the component side, as if looking through the board.

Lightly tin around all board mounting holes before mounting in chassis as these are earth connection points.

VERY IMPORTANT: PA transistor mounting hole must be large enough to take a small round insulation washer. This ensures that the drain tab does not contact earth.

The above unit is available in kit-form. For further information contact Rod at the above address.

QSP

COMPUTER PROGRAMS

Due to the length and quality of some computer program printouts, it is frequently impossible to reproduce them effectively for others to copy. Members interested in particular programs are advised to contact the author for an original copy of the relevant program. (Please include an SASE).

Authors of computer program articles, please remember to send a copy of your program on disc or cassette when sending an article for evaluation.

WIDEBAND VARIABLE FREQUENCY AUDIO OSCILLATOR

Lloyd Butler VK5BR
18 Ottawa Avenue, Panorama, SA. 5041

This oscillator makes use of a switched capacitor filter to shape square waves into low distortion sine waves over a frequency range of 2 Hz to 20 kHz.

A low distortion audio frequency sine wave can be easily generated by passing the output of a simple square wave oscillator through a sharp cut off low pass filter to attenuate the odd harmonic components. The output level of the sine wave is precisely defined by the rail voltage and the gain or loss in the filter.

A problem is that most filters have a fixed cut off frequency hence such a sine wave source is restricted to a small frequency range. There is, however, one type of integrated circuit package containing a switched capacitor filter in which the cut off frequency can be controlled by the frequency of a clock running at a multiple of the cut off frequency. The circuit described in this article makes use of a switched capacitor low pass filter type MF6-50 (a sixth order Butterworth) which operates with a clock frequency 50 times its cut off frequency. By controlling the frequency of the clock, the cut off frequency can be set to a range of values extending to above 20 kHz.

Using this filter, the circuit forms a variable frequency sine wave oscillator which can be tuned, at constant output level, over a frequency range of 2 Hz to 20 kHz with harmonic components less than 0.1 percent of the fundamental frequency amplitude, that is, more than 60 dB below that amplitude. As the sine wave is formed from a square wave, the square wave is also available as an alternative output.

THE SYSTEM

The basis of the system is shown in the block diagram, Figure 1. A clock (fck), tunable within the range of 112 Hz to 1.12 MHz drives both the switched capacitor filter and a divide by 56 counter which gives square wave output in the range of 2 Hz to 20 kHz. The counter output is fed to the input of the filter which has a cut off frequency (fc) equal to fck divided by 50, that is, 12 percent higher than the output frequency of the counter. With this arrangement, odd order harmonics in the square wave are attenuated to a level less than 60 dB below the fundamental frequency. Whatever the fundamental frequency, the cut off frequency tracks at 12 percent higher because both are controlled by the same clock source.

A characteristic of the filter is that it produces components near clock frequency 34 dB down from the fundamental frequency. These can be clearly seen on the CRO display and spectrum plot of the filter output illustrated in Figure 2. The actual components are the clock frequency itself plus difference components between the clock frequency and the fundamental frequency. For general audio frequency testing, these components, around 56 times the operating frequency, are possibly unlikely to upset the results of the testing. Notwithstanding this, their presence is a little disconcerting hence a simple secondary R-C filter is included, at the output of the switched capacitor filter, to reduce their level.

RANGE	FREQ	C3*	C6
1	2 - 6.3 Hz	200 nF	1.2 uF
2	6.3 - 20 Hz	62 nF	390.0 nF
3	20 - 63 Hz	20 nF	120.0 nF
4	63 - 200 Hz	6.2 nF	39.0 nF
5	200 - 630 Hz	2 nF	12.0 nF
6	630 Hz - 2 kHz	510 pF	3.9 nF
7	2 - 6.3 kHz	130 pF	3.0 nF
8	6.3 - 20 kHz	27 pF	1.5 nF

THE CIRCUIT

The complete circuit is shown in Figure 3. In addition to the switched capacitor filter, the MF6-50 package includes circuitry which can be connected up to form the clock by the addition of an external resistance-capacitance network which determines the frequency of oscillation. A frequency range of 112 Hz to 1.12 MHz can easily be covered with four ranges of selected capacity using a 40 kohm potentiometer, however it was found that eight ranges using a 25 kohm potentiometer was more satisfactory, firstly because of the improved resolution in setting a given frequency and secondly because of a problem in making the secondary R-C filter effective over too wide a range. The clock R-C network in Figure 3 is made up of R4, RV1 and C3A-H.

The secondary R-C filter is provided by resistor R6 and capacitors C6A-H switched in tandem with those selected for clock frequency range. The circuit reduces the high frequency ripple component to 55 dB below the operating frequency level at the high frequency end of

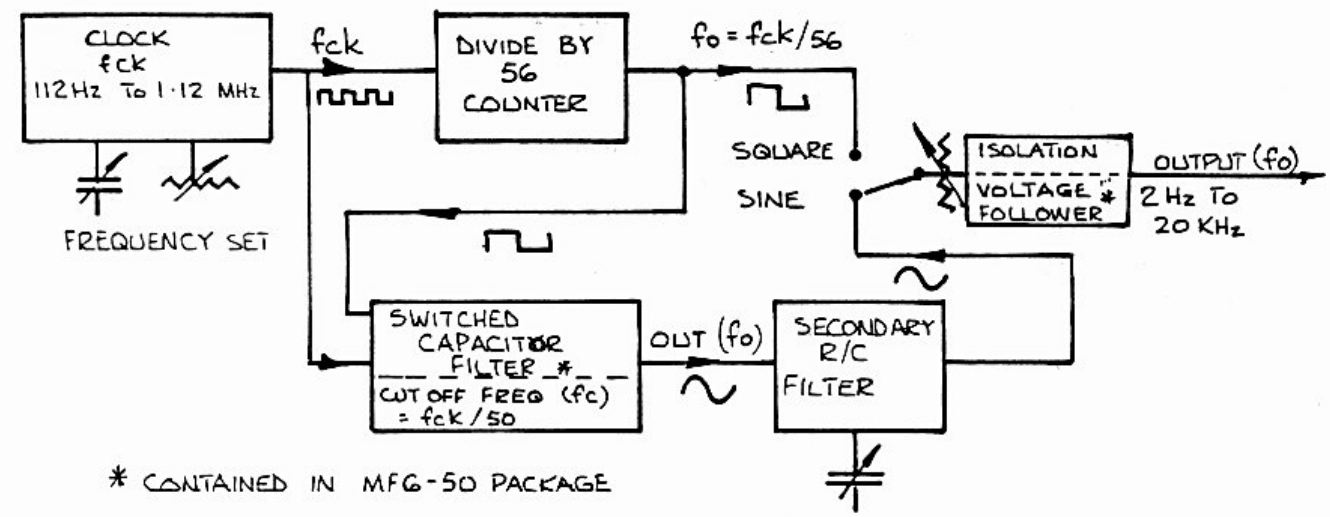
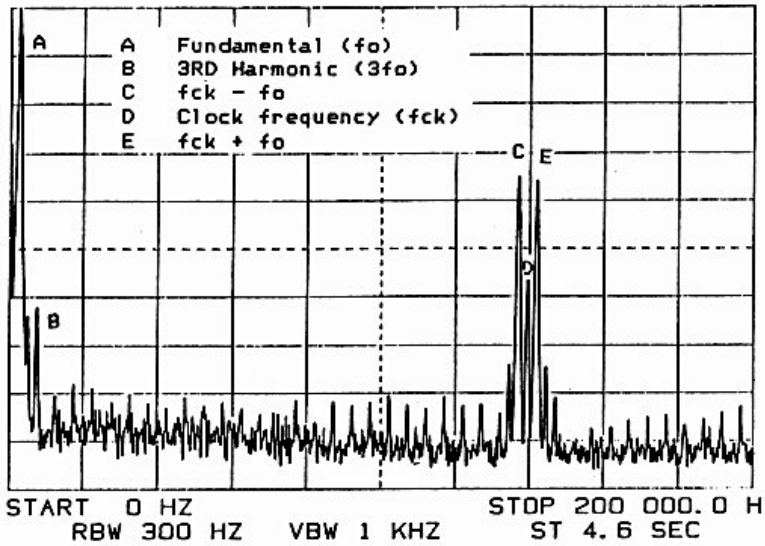
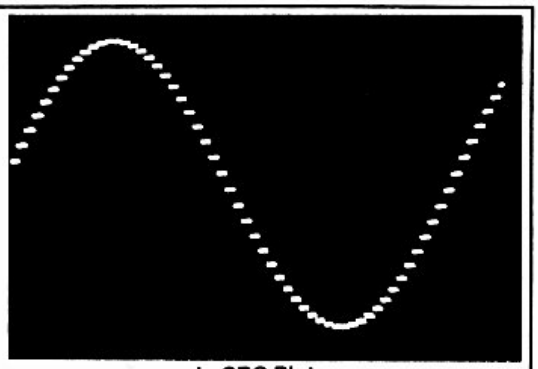


Figure 1: Wideband Oscillator — Block Diagram.

Figure 2: Output of switched capacitor filter with no secondary filtering.



a. Frequency Spectrum.



b. CRO Plot.

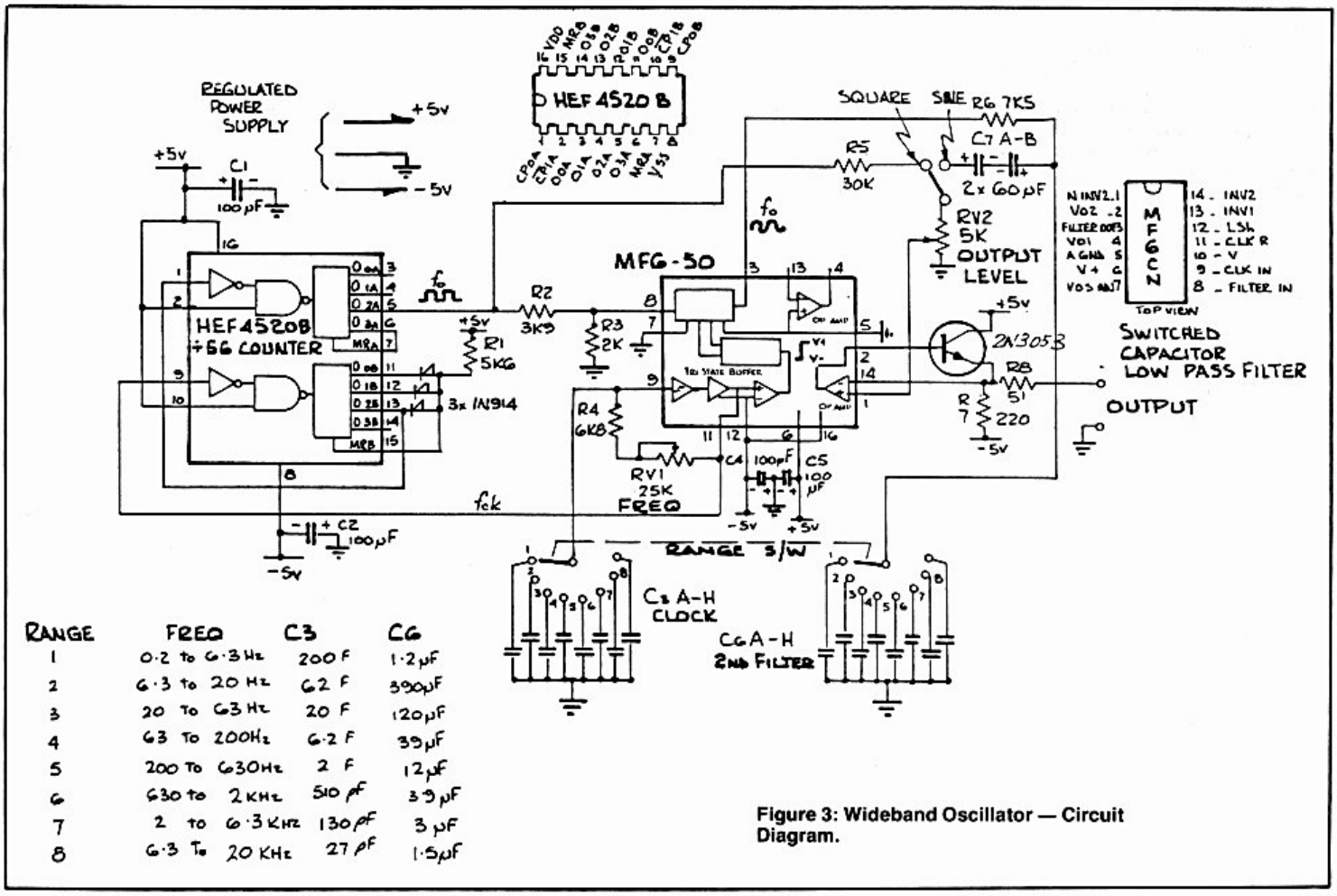
the selected range (refer to Figure 4) and 45 dB below at the low frequency end (refer Figure 5). At 45 dB down, the ripple can just be seen on the CRO trace.

Included in the MF6-60 package are two operational amplifiers. One of these is used as a source follower stage to isolate the secondary filter and output level control from the output circuit as well as providing low source resistance at the output. A transistor (V1) is included in the operational amplifier loop to provide sufficient current drive for the amplifier to operate as a 50 ohm source. Output of the stage is directly coupled to eliminate the very large coupling capacitor needed to prevent excessive waveform drop on 2 Hz square wave. Output resistance is set to 50 ohms by resistor R8.

A switch is provided so that either sine wave or square wave can be selected. The sine wave circuit is coupled via capacitor C7, found necessary because the output of the switched capacity filter had a DC offset.

The 4520B package contain two four-stage counters connected to divide by seven and eight respectively. The divide by seven counter must not be placed last because a divide by seven counter has an asymmetrical output waveform. The high speed CMOS version of the 4520 was used to ensure short rise time in the square wave output.

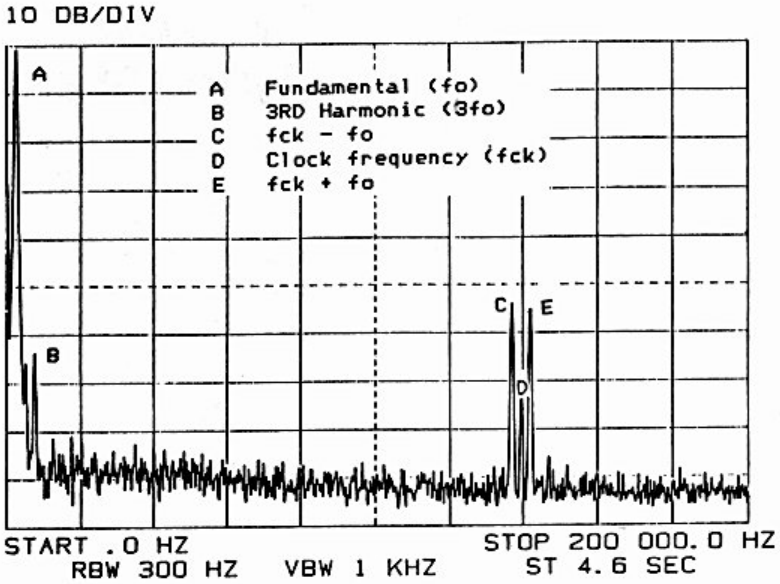
Provision of a split power rail (dual five volts) simplifies the application of direct coupling used throughout the circuit. The supply must



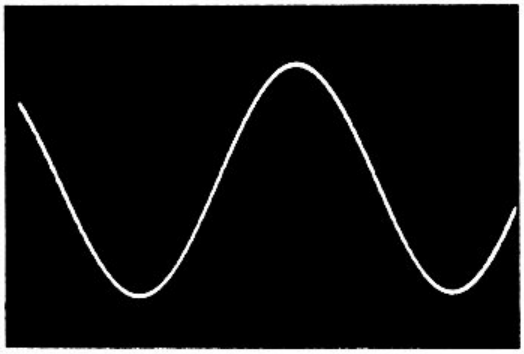
RANGE	FREQ	C3	C6
1	0·2 to 6·3 Hz	200 F	1·2µF
2	6·3 to 20 Hz	62 F	390pF
3	20 to 63 Hz	20 F	120pF
4	63 to 200Hz	6·2 F	39µF
5	200 to 630Hz	2 F	12µF
6	630 to 2KHz	510 pF	3·9µF
7	2 to 6·3 KHz	130pF	3 µF
8	6·3 To 20 KHz	27 pF	1·5µF

Figure 3: Wideband Oscillator — Circuit Diagram.

Figure 4: Output at High Frequency end of Range.



a. Frequency Spectrum — Ripple components 55 dB down.



b. CRO Plot.

be regulated as both clock frequency and output amplitude vary with rail voltage.

PERFORMANCE

Figure 6 is a spectrum plot showing the level of harmonics in the output. The highest level component is the third harmonic at 62 dB down and other odd order harmonics are more than 80 dB down. The second order component, 65 dB down, is not actually a harmonic originating from the square wave at the input to the filter. It is caused by interference from the second to last stage of the counter running at the second order frequency.

Examining the circuit (Figure 3), large capacitors are connected across the rails to ground at both circuit packages. These are essential to reduce interference from the counter and are quite large because of the very low frequency ranges covered by the oscillator.

The capacitor values in the secondary filter have been carefully selected to reduce the high frequency ripple as much as possible without upsetting the consistency of output voltage over the tuning range. An increase in capacitance value can reduce the ripple further but would cause a reduction in output level as the high frequency end of each range is approached.

On the highest frequency range, the switched capacitor filter produced an increase in output level towards the high frequency end of the range. The reason for this was not clear but its effect was compensated by increasing the secondary filter capacitor to a higher order than the other ranges. In consequence, the ripple level on this range is lower than on the other ranges.

Maximum output level for both sine wave and square wave is 1.5 VPP when unloaded or half that with 50 ohms load. DC load current on the five volt rails is 28 mA, mainly consumed by the output transistor.

ASSEMBLY CONSIDERATIONS

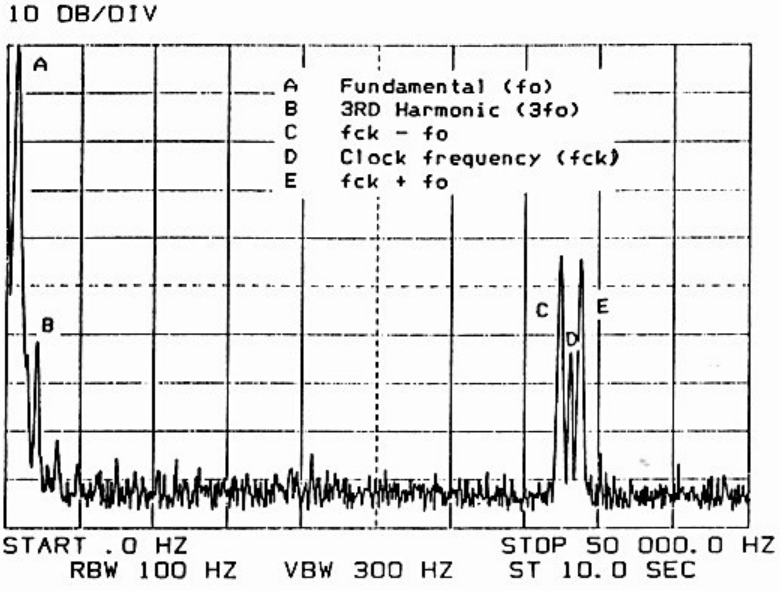
With the clock operating to a frequency above 1 MHz, at a voltage level of 10 VPP, inappropriate layout and proximity of wiring can lead to coupling of clock frequency component into sections of the output circuit. In the experimental model built, it was found necessary to shield all wiring following the switched capacitor filter output to reduce stray coupling into the output circuit when operating on the two highest frequency ranges.

Range selection capacitors were mounted around the switch wafers rather than on the component mounting card. This eliminated the need for a large number of wires between the switch banks and the card. The values of capacitors (C3A-H) which set the clock frequency are shown in Figure 3 as nominal values. In the experimental model, ordinary 10 percent ceramic capacitors were used and trimmed by experiment using large and small values in parallel to make the frequency ranges overlap.

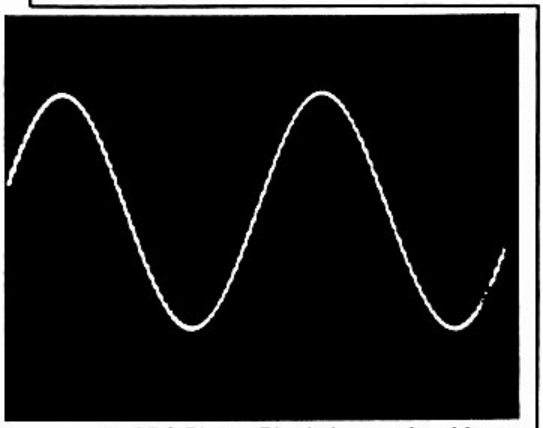
CONCLUSION

The circuit described is an interesting alternative to the conventional Wien Bridge oscillator

Figure 5: Output at Low Frequency end of Range.



a. Frequency Spectrum — Ripple components 45 dB down.



b. CRO Plot — Ripple just noticeable.

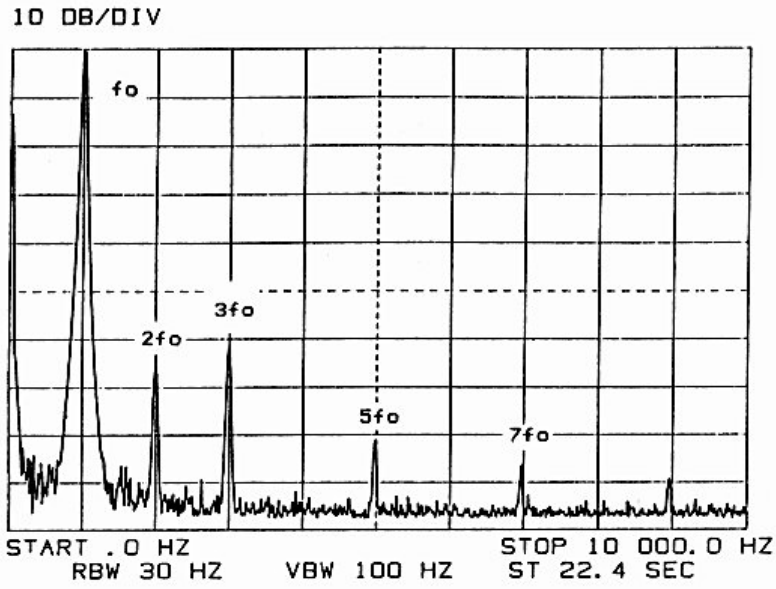


Figure 6: Spectrum plot of output showing harmonics.

which requires a ganged variable tuning capacitor and feedback to stabilise the output level. A criticism could be the ripple level near clock frequency 45 to 55 dB down. The level of this is determined by the secondary filter and could be improved with a more complex filter circuit than the simple one used.

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TWO VALVE AUDIO AMPLIFIER

Peter Parker VK6NNN
Aged 15
C/- PO Witchcliffe, WA. 6288

This amplifier is quite sensitive and gives speaker output with a high impedance microphone.

It would also amplify the output of small valve receivers and could be used to play records with a ceramic cartridge and a turntable.

The original circuit appeared in *Fun with Shortwave Radio* by Gilbert Davey. This circuit uses 6J7 and 6V6 valves and has negative feedback.

More modern valves have been substituted and the negative feedback has been omitted. Try to build this amplifier carefully and use shielded wire to and from the 500 kohm volume control. Three or four tag-strips with five terminals each are sufficient to build the amplifier.

Editor's Comment: This inspires nostalgia for the times before solid-state! Nevertheless, for a novice with no money and some old valve television sets it could be instructive and fun. Caution, beware of high voltage. An LM380 will not bite you, but this certainly can!

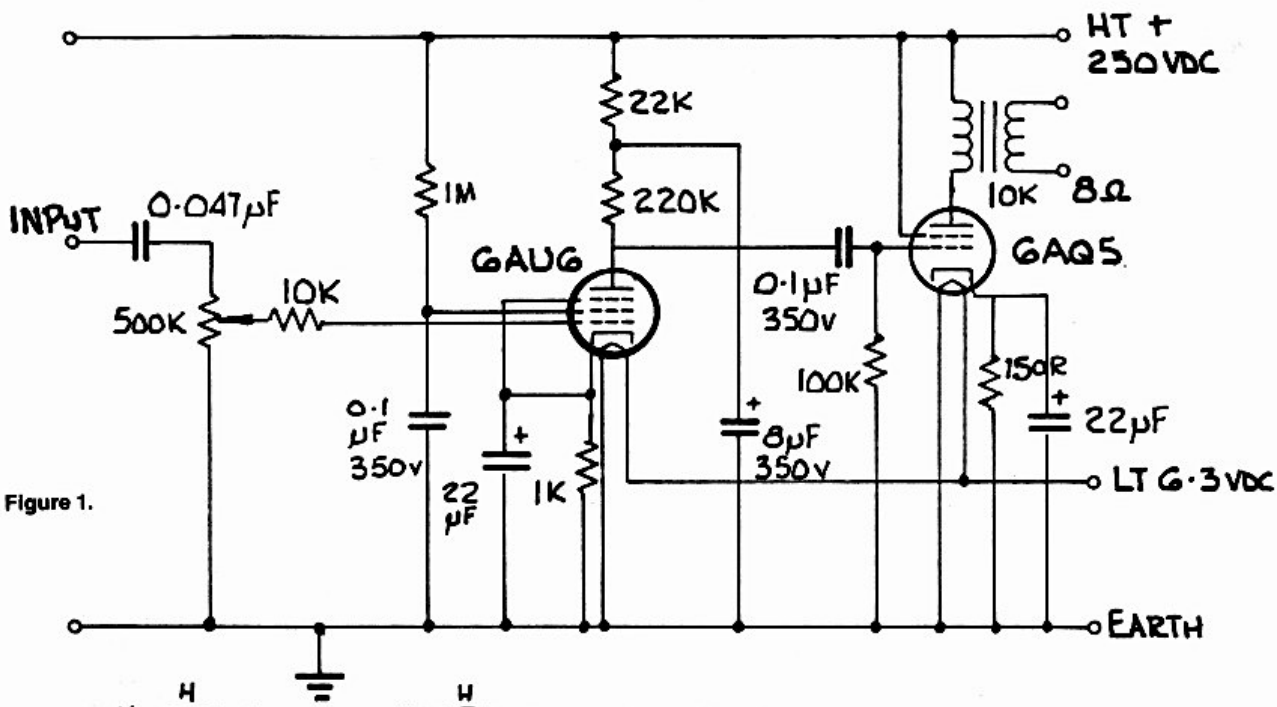


Figure 1.

PARTS LIST

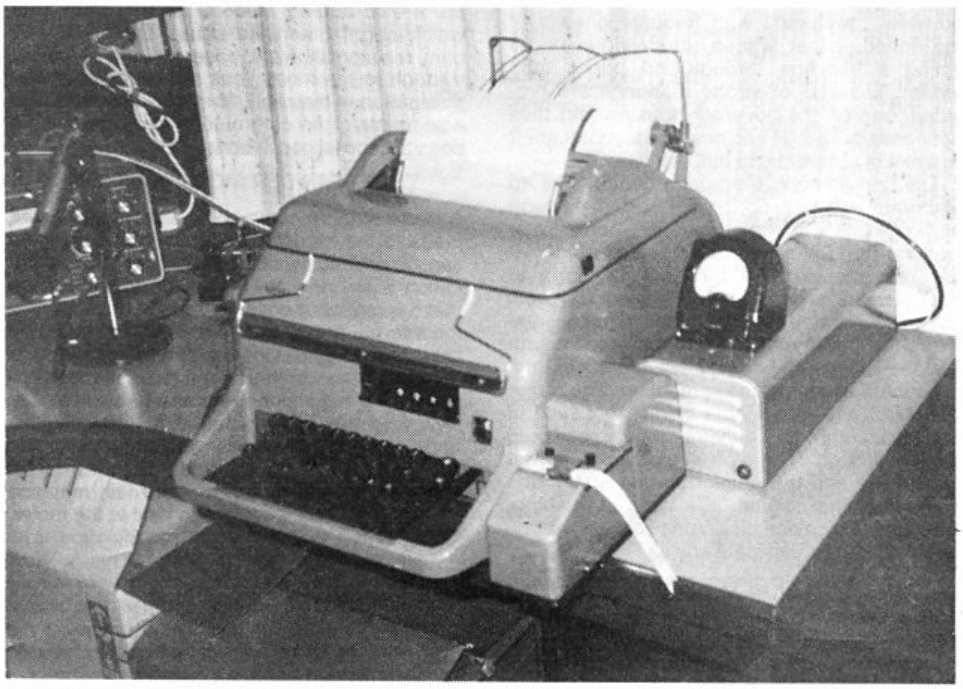
1	150 ohm Resistor ½ watt	2	0.1 uF Capacitor 350 volt
1	10 kohm Resistor ¼ watt	2	22 uF Capacitor 25 volts
1	22 kohm Resistor ½ watt	1	0.047 uF Capacitor 350 volt
1	100 kohm Resistor ¼ watt	1	6AU6 Pentode
1	1 kohm Resistor ½ watt	1	6AQ5 Beam Power Pentode
1	220 kohm Resistor ½ watt	30 cm	Shielded audio cable, Nuts, Bolts, Tag Strips, Case, 10 kohm-8 ohm Speaker Transformer, Speaker.
1	1 Mohm Resistor ¼ watt		
1	500 kohm variable Resistor		

ar

DUAL SPEED CONTROLLER FOR THE SIEMENS MODEL 100 TELEPRINTER

Morris Odell VK3DOC
84 Hill Road, North Balwyn, Vic. 3104

The M100 is just the thing for working HF DX, but it is necessary to change the speed for reception of different HF signals.



LIKE MANY OTHER amateurs, I had my introduction to the world of RTTY on the two-metre band using a computer or "glass" system. This gave much pleasure, both in its' design and construction, also its' operation. It indeed opened up a whole new world of repeaters, mailboxes and many new friends. After a time, I began to wonder if similar pleasure could be achieved from HF operating with this exciting new mode and, in due course, an interface with the HF rig was arranged.

At first the bands seemed alive with signals but it was not long before it was realised that these signals were, in fact, emanating from the computer — a potent source of interference with its master oscillator right in the middle of the 20-metre band and all those digital ICs merrily switching and generating "birdies" right up into the VHF spectrum. Initially, conventional means were tried to alleviate the problem — screening, optocoupling, etc — but, eventually I had to admit defeat. This was when I met my *Marvellous Mechanical Mistress* — the Siemens Model 100 teleprinter.

The M100 was just the thing for HF DX operation but it soon became apparent that there were different speeds being used on HF. Whilst it may be easy to change the speed of a computer RTTY program by merely pushing a button, it is quite another matter with the electro-mechanical governor in the M100.

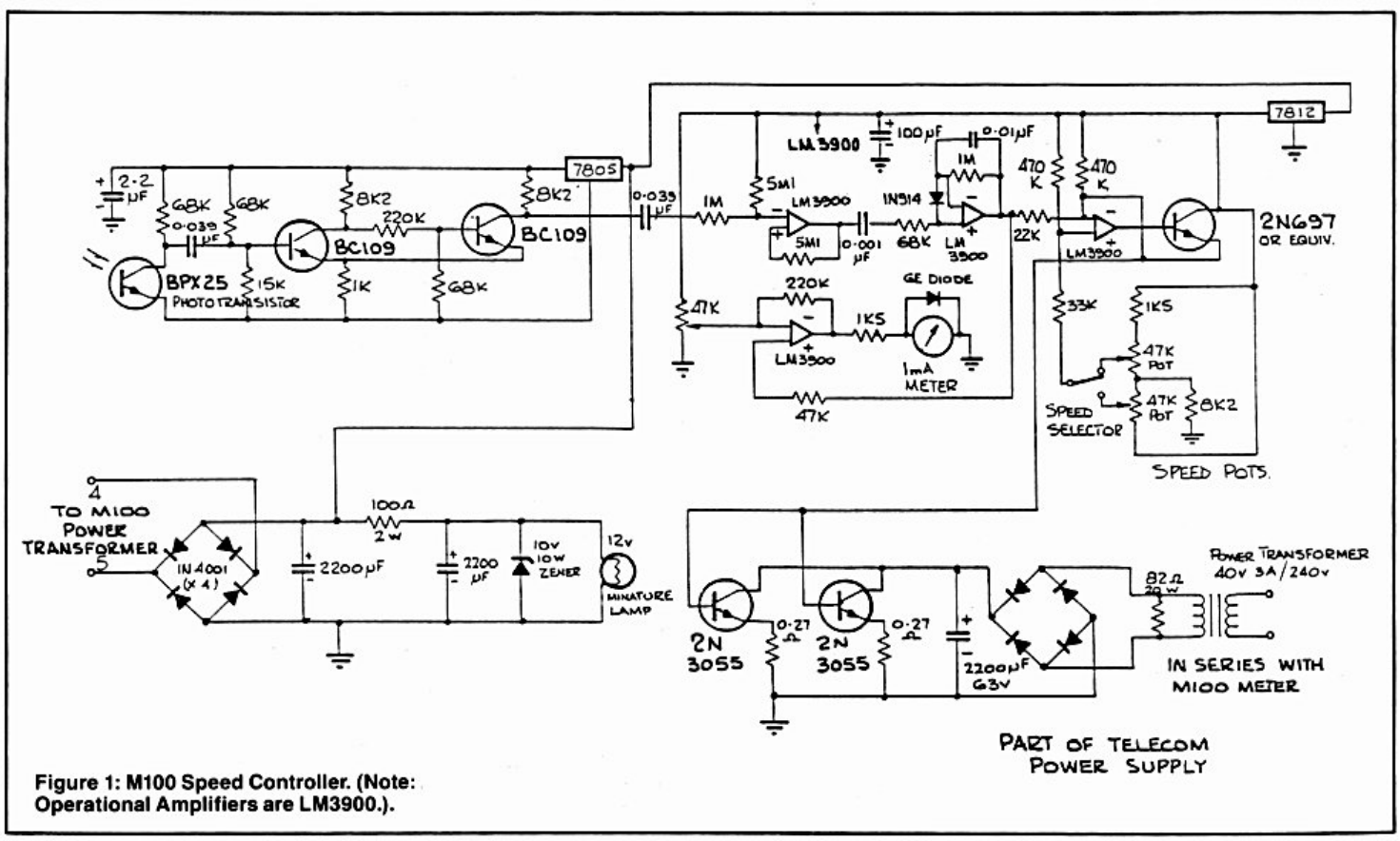


Figure 1: M100 Speed Controller. (Note: Operational Amplifiers are LM3900.).

As fellow addicts will know, the motor in the M100 is a series wound universal type, similar to those used in electric drills, which is equipped with a centifugal governor which opens and closes a set of contacts across a ballast resistor in series with the motor. It is enclosed in an RF-proof diecast housing and has extensive filtering provided for the mains leads. The system works extremely well but, in order to change speed the cover must be removed and an adjusting screw on the governor "tweaked" with frequent checks of the speed, either with a stroboscope or by timing a test-tape through the paper tape reader. Two sets of strobe markings are provided, one on the governor housing and thus not normally visible, and one on the motor shaft where it is accessible to this device.

The first attempt at a speed control was an elaborate affair using optical speed sensing and a digital, crystal controlled comparator working through a triac arranged to trigger at the zero crossings of the line waveform to minimise noise generation. This worked well, but still generated significant noise, mainly due to problems with motor reactance which meant that the voltage and current waveforms did not pass through zero at the same time. The range of control was also a little "jerky" because of the requirement that only integral cycles could be let through. Therefore, reluctantly, it was dismantled and the project started again, this time avoiding digital ICs and switching. Although this device dissipates some power as heat, it does not dissipate any as RF!

THE SPEED SENSOR

This is the only piece left over from the digital version and could be improved upon in any future version by using an IC comparator. It consists of a photo-transistor and lamp oriented to look at the strobe disc on the motor shaft. The photo-transistor signal is amplified and squared in a Schmitt trigger formed by the two BC109 transistors. The lamp is supplied from a regulated supply derived from the internal power transformer in the M100, which also supplies the rest of the controller. The output of this circuit is a square-wave at 250 Hz for 50 Baud and 227.250 Hz for 45.45 Baud. The lamp and sensor are mounted into holes in a scrap of perspex mounted over the strobe disc. It was found that the mechanical arrangement of the lamp and photo-transistor, as well as the lamp voltage were critical in order to get a reliable output, and once the right arrangement was found, it was sealed to the motor housing with epoxy resin. The amplifier/trigger was built on a small piece of circuit board and mounted over the motor gear housing.

THE CONTROL CIRCUIT

This uses a quad operation amplifier type LM3900. The first section is a Schmitt trigger/ line receiver and serves to stabilise the pulse amplitude from the sensor to provide a constant amplitude square-wave which is required for the next stage.

This is followed by a "frequency doubling" tachometer which develops an output voltage proportional to twice the frequency of the input square-wave. The output of this stage feeds the final stage which is a summing (servo) amplifier which compares the speed signal with a DC reference derived from the (regulated) power supply rail via two trimpots, which set the two speeds, and a switch for speed changing. The output voltage controls the current through the pass transistors and, ultimately, through the motor. The output of the tachometer also feeds the fourth amplifier which controls a meter to display the speed directly.

THE REGULATOR

A power transformer and rectifier are used in an unconventional series connection to "transform" a DC series pass element across to the AC side. This allows the 2N3055 transistors to function as if they were effectively in series with the motor. The 2200 μF capacitor charges rapidly when power is first applied and acts as an initial short circuit across the regulator, thus applying full power to the motor for a quick run-up. It also acts to smooth out any transients which might otherwise cause QRM. The 82 ohm resistor allows a base amount of power through to the motor thus reducing the power dissipation in the regulator transistors and also acts to damp the control loop in order to avoid possible speed oscillations.

TELEPRINTER MODIFICATIONS

A number of minor modifications need to be made to the Model 100. Apart from the speed sensor previously described, the main modification is to bring out the motor active lead so that the regulator does not reduce the supply to the internal power transformer which would be the case if this device was merely inserted in the power lead to the teleprinter. This requires separating the insides from the base-plate and removing the jumper between terminals two and three on the terminal strip under the components. A new wire is then run from terminal three to pin a2 on the main machine connector — this is the active lead to the motor.

The only other important modification is to double the old speed regulator. This is most conveniently done by soldering a wire across the green power resistor mounted just above the governor brushes. Alternatively, the governor could be set for a "ceiling" speed above 50 Baud, but this would involve destroying its previous calibration. It is possible to use some of the previously unused pins on the machine connector for the various connections required for this circuit and, if this is thought desirable, the connections under the machine should be modified accordingly whilst the bottom plate is removed — a little thought beforehand is vital as there is no sense in disassembling such a hefty machine more than once! ! !

POWER SUPPLY

The power supply was built on a small board tucked above the power transformer in the M100 which has two free windings, a low voltage (about 18 volts) and a high voltage (about 140 volts). Many amateurs use the high voltage winding for a loop supply. If it is decided to use this transformer, the low voltage winding is brought out to terminals four and five which are the upper two on the left side.

The circuitry requires five volts for the Schmitt trigger (a relic of the original digital version) and 12 volts regulated for the control circuit. Regulation is quite important as the speed reference voltage is derived from the 12 volt rail and, if this varies, the speed varies with it. When power is first applied, the lamp does not reach full brilliance for a few milliseconds and there is no speed feedback thus allowing the regulator to apply full power to the motor for a rapid run up. The time this takes can be reduced by reducing the lamp series resistor and the zener diode is required to limit the lamp voltage for normal running.

CONSTRUCTION

There are very few critical parts in this circuit. The author used an ex-Telecom disposal power supply such as were available from the WIA in Melbourne some time ago. The transformer, rectifier and filter capacitor in these devices are ideal and there is plenty of room in the well-ventilated housing once the filter choke and bleed resistors are removed. Anyone who has felt the ballast resistor in the M100 motor knows how hot it gets and, of course, an equivalent amount of heat is generated by this regulator. The power transistors should be mounted on a hefty heat sink and adequate ventilation should be allowed for this and the 82 ohm resistor. It would be possible to us a differently rated transformer, but the 82 ohm resistor and the number and rating of the power transistors may have to be changed to suit. The meter was mounted in a plastic housing on top of the housing with the speed selector switch just below.

A few component values may require individual adjustment, especially if the power supply voltage is changed. No trouble has been experienced from nearby transmitters affecting the circuit.

ADJUSTMENT

The only adjustments required are to set the two trimpots to the proper speed. This is best accomplished with a frequency counter connected to the sensor output. Adjust the pots for the frequencies given above. If a frequency counter is not available adjustment can be achieved with timing a paper tape with a known number of characters through the tape reader or set the pots up for good copy with a signal of known speed from a computer, or off the air. Failing all else, tuning for a motor note that sounds right is remarkably accurate, especially if the operator is used to the sound of the M100 from long experience. Once the speeds are right, set the meter range pot to give convenient indications on the meter. Slight speed variation with typing will be indicated on the meter and this is a useful indication that the control loop is working properly. There is also some warm-up drift due to gain variations in the power transistors with temperature but this is not enough to move the speed out of range.

MODIFICATIONS

There is plenty of room for improvement in this design, as much of it has evolved through many versions and experiments and the choice of components reflects what was in the junk box at the time. It is by no means intended as the last word in speed controls and there is plenty of room for experimentation. The light bulb could of course be replaced with a LED and the zener diode with a three terminal regulator IC. It is not recommended using the same regulator as for the rest of the circuit as it may have an adverse effect on voltage (and therefore speed) regulation. The Schmitt trigger stage could be dispensed with altogether, the operational amplifier stage being redesigned accordingly.

Increasing the servo gain would certainly reduce any speed error although this has not been tried. Including the power transistors in the servo amplifier feedback loop would also help, but may require higher emitter resistors which would introduce an unwelcome current feedback component. The response time and over-shoot would also be improved but the physical inertia of the mechanical parts of the M100 will set a limit on this and any further increase in servo gain will eventually result in oscillation.

The M100 manual says the machine can be used on 75 Baud and the controller can certainly accommodate this speed but it is not known whether other modifications may be required to the machine for such a high speed.

POWER SUPPLY LOW LOSS FULL PROTECTION

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With a fixed voltage power supply it is easy to provide over-voltage protection with a Zener diode across the output.

The use of a current sensing resistor for providing protection for a power supply has the disadvantage that a wide range of current variation results in the voltage drop being too high at one end of the range, or too low to work effectively at the other. The voltage drop can be eliminated entirely by using an audio transformer with a single turn in series with the secondary of the supply power transformer. Having used this method successfully for some time, an unusual, but catastrophic fault — a short circuited regulator transistor — prompted the further development of a circuit which would protect the equipment as well as the power supply itself. With a fixed voltage power supply it is easy to provide over-voltage protection with a Zener diode across the output, the Zener voltage being slightly higher than the fixed voltage. With a variable voltage supply this cannot be done. One practical alternative is to use any sudden, small rise in the regulated output voltage to shut down the power supply. The circuit in Figure 1 incorporates both the no voltage drop current and the over-voltage protection.

A single turn (or possibly two) of 10 gauge wire in series with the power transformer's secondary and the supply's rectifier bridge is wound on to a small transformer and gives a negative pulse to cut off Q1 at the level set to trigger the control. The potentiometer across the secondary provides this continuously adjustable level control and R1 can be placed in series if a fixed maximum current limit is required. D1 contributes negative pulses to the summing junction of Q1 which is normally conducting. D2 is added to clamp the junction when the pulses go in to the positive half-cycle. The 47 ohm resistor in series with D2 gives the voltage drop necessary to keep Q1 normally conducting and this causes Q2, which replaces the conventional UJT, to be normally cut-off.

Returning to Q1, it can also be cut off by a negative pulse through C2 from Q3. Q3 is normally cut off by its base being grounded through the 5M resistor to the negative rail. The base, however, is also connected to the regulated output of the supply through capacitor C1 and if the voltage rises sharply (about 0.7 volt) then Q3 will conduct and cut off Q1. This is independent of the actual DC level of the regulated output and thus can be used with a variable voltage power supply. Diode D3 in series with D4 provides about 1 volt drop and, if test switch SW1 is closed, the rise is sufficient to trip the circuit. Apart from a test facility, SW1 can be used as a fast acting remote control to trip the power supply.

Q2, which replaces the conventional UJT, actually functions as an emitter follower and a delay. When the supply is first switched on, the rail voltage rises sharply and this would normally trigger the circuit. But, even if Q1 is cut off by the voltage rise, and/or a current surge, the silicon controlled rectifier will not be triggered provided that R3 and R4 in parallel and in series with R5 cannot provide a trigger signal for the SCR. But, as soon as the voltages and current stabilise and Q1 conducts and Q2 is cut off, the capacitor C3 charges and thereafter supplies sufficient current for the SCR to be activated instantly whenever Q2 conducts again. The SCR can be used to cut the output, put a "crowbar" short across the regulated output, and/or disconnect the mains and provide protection both to the power supply and the equipment.

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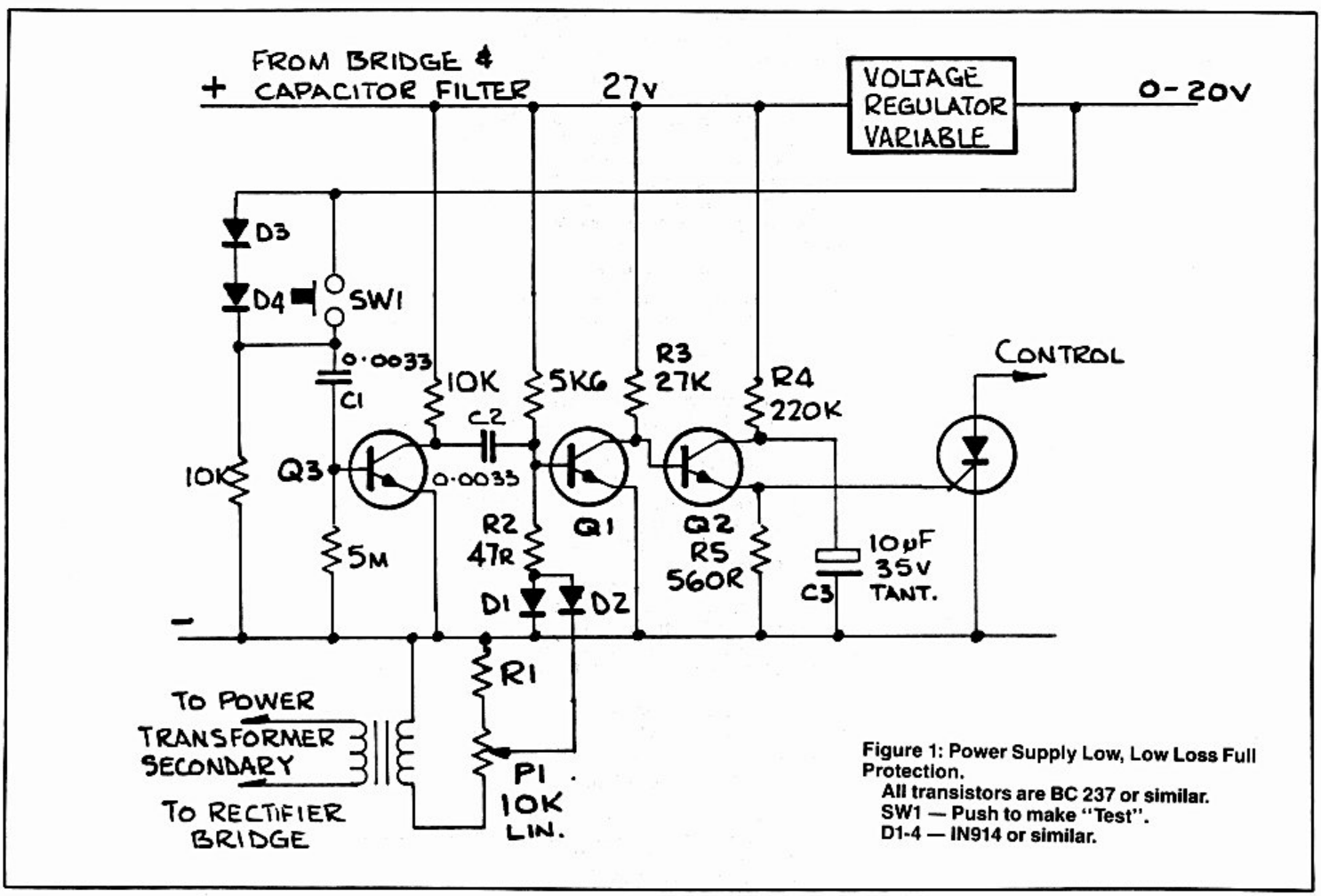

Figure 1: Power Supply Low, Low Loss Full Protection.
All transistors are BC 237 or similar.
SW1 — Push to make "Test".
D1-4 — IN914 or similar.

THE TEARS AND JOY OF OWNING AN FT102

Imagine watching your new equipment in flame and blowing madly until the smoke subsided!

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In 1983, I read all details on the then available transceivers to come to a decision on which to buy to replace my old faithful FT101B. I took a fancy to the FT102, which I thought would satisfy my requirements. Reasonable power output, band coverage 1.8 to 30 MHz with WARC bands, good selectivity, notch filter, IF bandwidth, shift audio filter, etc, valves as driver and in the final, ideal without resorting to memories and computing facilities as per the latest models.

After taking delivery, I sat down with the instruction manual to familiarise myself with the finger touch controls, etc, before switching on.

After a couple of hours, I ventured to explore the receiver and then the transmitter. Imagine my thoughts when, after one hour of operating, the output failed. The 6146 valves were soft and replaced by the agent. Receiver selectivity was extremely broad on 1.8 MHz, a signal on 1.870 MHz covered the whole dial. The 3.5 MHz band was a little better, as was 7 MHz and higher.

Everything was tried to improve this, from installing available CW filters — the 8 MHz was useless, but the 455 kHz did improve selectivity and a 10, 20, 30 dB attenuator in the antenna was tried. This helped also, but selectivity still left something to be desired. Writing to Yaesu provided no solution to the fault.

After a few hours of operation, the transmitter again failed — RO4 a 470 ohm, 2 watt resistor in Rectifier A PCB had failed. Over one weekend, this resistor was replaced six times — the final time smoke poured out of the top cover and burst into flame. Can you imagine watching your new equipment in flame unable to get the top cover off? Quickly the power was switched off and blowing madly until the smoke subsided, the resistor was then replaced with a five watt wire-wound.

Reading of a cure to stop the faults in 6146s, having screen grids expanding and shorting to the plate, causing the 900 volts back voltage flowing through the screen voltage components, a 1N4007 1000 volt diode was placed in series with the screen voltage on the PCB. Also, an in-line fuse was placed in the HT line to the final. There was no more indication of the fault after this modification.

Until now, the set had not been used above 14 MHz. The search for poor selectivity continued.

Whilst the set was still under warranty I was in QSO with a P29 and he asked me to QSY to 28 MHz. Half-an-hour later, returning to 14 MHz, he asked me where I had been — I had been unable to tune-up on 28 MHz.

With top cover removed, and looking down on the wave-change switches with a strong torch, I could see that the wafers were irregular and not making contact when switched to 21, 24 and 28 MHz. The set was returned to the dealers who replaced the damaged wafers.

The next fault began with the mains fuse blowing, and continuing to blow each time it was replaced. Isolating circuits proved the trouble was in the final. One 6146 was replaced. The receiver still performed poorly so the FT102 was replaced with the old reliable FT101B!

After use for an hour or so, a new fault showed in RO1, with the Rectifier B board heating-up, the IF shift/width control wouldn't centre, monitor oscillator was audible through the speaker on receiving and the transmitter signal chirpy. With switching the transmitter heaters and fan on altered the width of the IF, on tune and closing the key a chirpy carrier could be heard.

The high current through RO1 proved to be due to QO1 (2SA733Q) being open circuit and all the current was being carried by RO1, which then went open-circuit.

Replacing RO1 and QO1 restored the 12 volts, but regulation was still poor. QO2 was replaced with a 1 amp regulator and I retired to bed. Next morning,, instead of 12 volts, it now read 24 volts! All circuits were isolated and the fault tracked to Q1 (2SB705R) which had broken down. Unable to obtain a new one, it was replaced with a higher rating JE2955.

A few days later, the receiver 24 volts and transmitter 12 volts failed. Replacing QO3 and QO4 did not restore the voltages and DO7 was found to be shorting to earth. Replacing DO7 restored the voltages.

Now, for the breakthrough. Checking all voltage outputs showed there was no 15 volts, Replacing QO5 restored the 15 volts and, when checking the receiver, the difference in operation was miraculous. Sensitivity was something to hear and the IF shift/width now operated as per specifications. At last, the joy of operating on crowded bands with the aid of modern technology, and one could appreciate the use of an IF shift/width notch filter or the audio filter.

A study of circuit diagrams showed that the 15 volts operates the IF shift and the poor selectivity was due to the absence of that voltage. The search had taken a long time, but then one would not expect to find a missing voltage in new equipment!

It appears that component rating has no safety margin. The advice is to replace voltage regulators and other components with ones of higher rating as they fail.

There has now been several months of trouble-free operating. One well-known 160 metre SSB net identity offered to send a tin of yellow paint to put on the transceiver as it was considered a "lemon." "Sell it" said another, but how could one sell a piece of equipment with so many faults.

Periodically, the in-line 900 volt fuse or main fuse would blow and one would have to undo the final compartment and check for a faulty 6146. Sometimes one would have a bright red glow. This was most evident by low plate current and output.

It is good practice never to operate the transmitter while the set is upside down. Remember the 900 volts is always on the plates and any sagging in elements or material dropping from the cathodes can cause destruction.

I had a run of fuse-blowing and came to the conclusion that the tubes were running hot and the elements expanding. Taking the compartments away, they ran normally. A small hole was cut with a valve socket cutter to the top plate above each valve so that the fan drew air down from the top and circulated it around each tube. The final is much cooler.

Another period of time lapsed before the mains fuse blew again. This time it was traced to the bridge diode rectifier, S4V10, which supplies 15 volts to Rectifier B board. It had shorted across the input, so was replaced with a 10 amp component.

Next thing to be noticed was the meter reading 700 volts instead of 900. Checking with another meter confirmed this. Replacing D1, D2, D3 and D4 on Rectifier B board restored the voltage to 900 volts. Surely this must be the end of the line — but no!

Interested in the new Russian satellite, I was checking the receiver on 21 and 29 MHz. The receiver sounded low. Lengthy investigation eventually revealed a dry joint in the antenna relay unit.

A few weeks later the mains fuse again blew, along with the 900 volt line. Plate current was very high as they blew but screen and bias supplies were to be alright. It was found that bias was not on one of the 6146s. Whilst removing the tubes movement of a pin was noticed through the PCB, which made connection to the bias voltage. This pin, over a period of removing the valves, had worn a hole slightly larger until it was no longer making contact. The result was no bias, the reason for the high current and fuse blowing.

Looking through a magnifying glass showed that the pin had never been soldered on the board — consequently fault cured.

Time elapsed until one day the final would only draw 200 mA on tune-up, a sign of poor emission in the valves. Many hours were spent changing to spare valves but all showed the same state. Finally, voltage of the 6146 plates was measured which revealed just over 400 volts, yet the in-built meter showed the normal 900 volts. A search showed the lead that connects to the 900 volts pin on the Rect B board had been broken with movement of wires. Resoldering cured the problem.

Next the digital readout started to go blank on the 21, 24 and 28 MHz bands. In attempting to restore the readings the wrong transformer must have been tweaked which upset the whole local unit board so there was nothing working from 1.8 to 30 MHz.

A study of the frequency relationships and careful re-alignment as per the manual restored all except the 21, 24 and 29 MHz bands. These bands rely on the mixer Q25 being fed with 13.715 — 14.215 MHz from Q24 and with 10 MHz from Q27 or 20 MHz via doubling in Q29. The mixer frequency of 33.715 — 34.215 MHz was not being tuned through TO7, TO8 or TO9. The use of the RF probe on a VTVM, frequency counter signal generator and oscilloscope failed to produce the required frequencies. The signal generator was used to feed a signal through T7, 8 and 9 and I managed to peak the transformers but there was nothing when connected to the mixer via D68. Diode 68 was replaced. I was able to peak the transformers and the correct

Please turn to page 26

BOILING WATER — RF-style

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No self-respecting amateur's shack would be found without a dummy load or terminating load resistor these days, but have you ever wondered what our big brothers (the broadcast stations) use to soak up multi-kilowatts of RF energy during transmitter tests?

The purpose of this article is to enlighten readers to the construction and operating attributes of a large commercial dummy load unit, capable of sinking 50 kilowatts of power with ease. Whilst not the thing to be found in the average amateur's shack, (I could be wrong!), it will be seen that it is comparable to the small units that amateurs are used to operating.

The terminating load resistor that will be described has one major difference compared to our smaller units. That is, it will be capable of dissipating a large quantity of heat and have the ability to remove this heat rapidly in order to avoid destruction of the load element. To this effect, the unit is comprised of three assemblies.

a. The resistive element,
b. An efficient cooling system, and
c. A control network.

Each of these assemblies will be examined in detail.

Resistive Load Element

The terminating load resistance is composed of a tin oxide film which is fired at high temperature onto a high quality hollow glass tube. The design as such allows the passage of a high velocity coolant (in this case, distilled water) through and over the resistor to remove the heat generated by the transmitter power. The coolant enters through the end of the glass tube, flows through it and then by means of specifically designed baffles, about faces and flows back over the film and absorbs the dissipated heat energy.

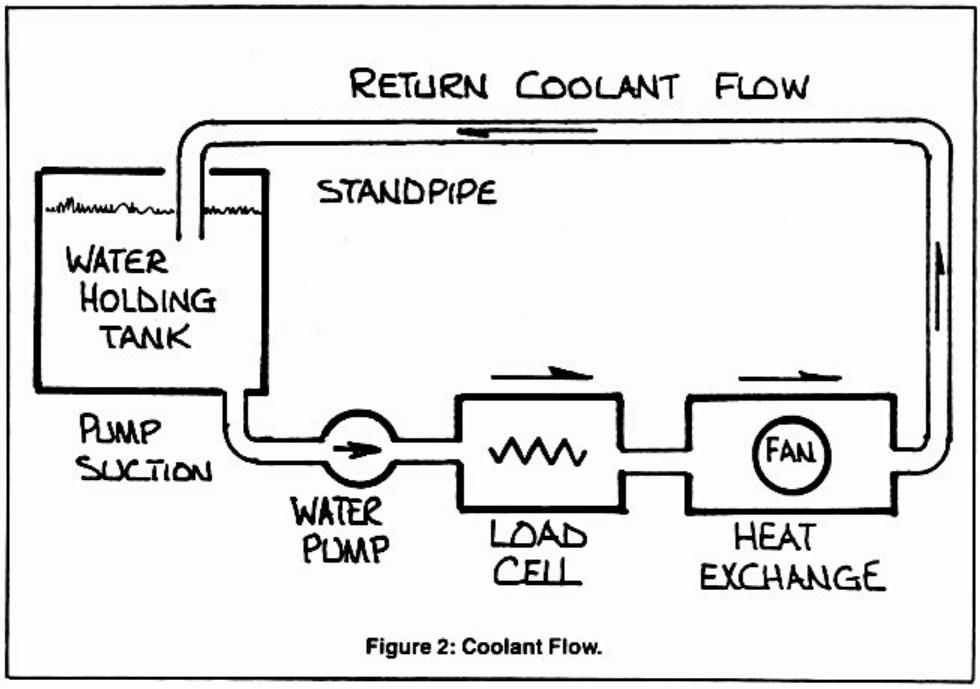


Figure 2: Coolant Flow.

The heated coolant then flows through the heat exchanger and is cooled by forced air before entering back into the reservoir holding tank.

Figure 1 shows the construction of the load cell, Figure 2 shows the coolant flow and Figure 3 illustrates the electrical overlay.

It should be noted that the physical dimensions of the load resistor are approximately 200 millimetres (8 inches) long by 50 millimetres (2 inches) in diameter. When one considers that, up to 50 kilowatts of heat will be dissipated on a surface area of roughly 50 square inches, which corresponds to one kilowatt per square inch, it can be seen that a highly efficient and reliable cooling system will be required!

The Cooling System

The system comprises a high velocity, medium pressure pump, water reservoir holding tank, finned copper cooling coils and associated forced draught cooling fan.

The system operates as follows:
Water is drawn from the reservoir tank into the pump suction inlet, and excited under a pressure of approximately 50 pounds per square inch to the inlet manifold of the load resistor housing. Heated coolant then flows under pressure into a series of finned coils similar to those found on the back of a room air-conditioner. These coils surround the walls of the entire unit. A high capacity fan mounted in the top of the enclosure draws cool outside air through the fins and re-

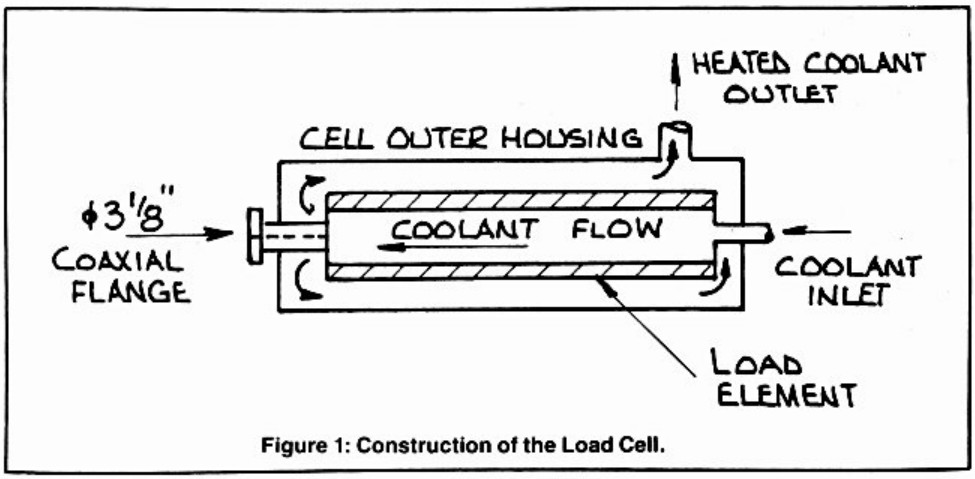
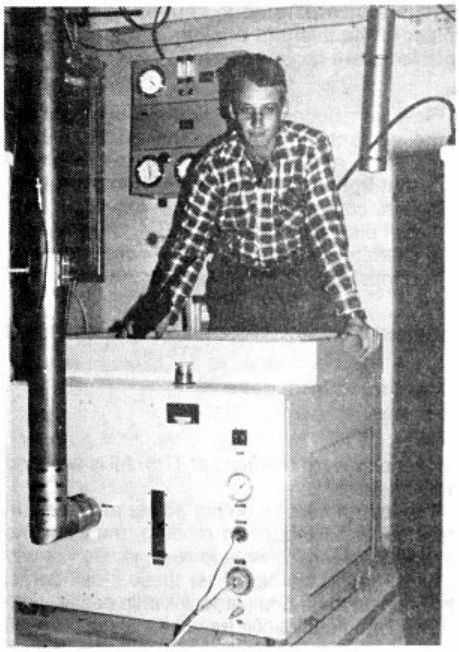


Figure 1: Construction of the Load Cell.



A Super Dummy Load!

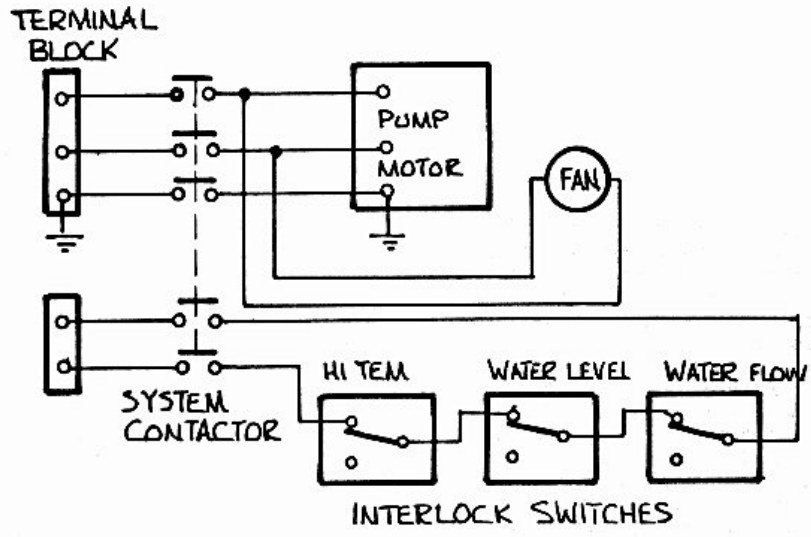


Figure 3: Electrical Overlay.

moves the sensible heat component from the coolant. The lower temperature coolant then flows back into the top of the reservoir tank and the cycle is repeated.

As stated earlier, the inlet pressure to the manifold is roughly 50 pounds per square inch. This coupled with a three-quarter inch diameter inlet pipe allows one to visualise that a hefty flow rate across the resistor will be evident. The heated exhaust air is vented to the outside of the transmitter building.

Control and Protection Circuits

As can be appreciated, considerable damage can be done to the dummy load in the event of a malfunction of the cooling system. Damage could also very likely occur to the transmitter should the resistive element fail.

In this regard, protection and interlock circuits are incorporated to shut-down the transmitter in the event of a failure of the load. The interlocks are grouped as follows:

Flow transducers pick up the movement of the coolant as it enters the load resistor manifold and supplies a closed contact output from its switch assembly to the other switch contacts as can be seen on the circuit diagram. Should the flow drop below a predetermined level, the switch opens and trips the control circuits in the transmitter.

High temperature coolant sensors also monitor the flow and likewise open the control circuits should the temperature rise to a level of 185 degrees Fahrenheit. This condition could easily occur if excess power were to be applied to the load and/or if the coolant flow was restricted in any way. Finally, a level switch trips the circuit if the reservoir capacity drops to a preset low level.

The RF connection to the dummy load described is made by a three and one-eighth EIA coaxial flange fitting.

The loads technical specifications are as follows:

POWER RATING: 50 kilowatts
INPUT IMPEDANCE: 50 ohms
FREQUENCY RANGE: DC to 1000 MHz
VSWR: 1.1:1 DC to 1000 MHz
OPERATING MODES: CW, AM, FM, TV
TEMPERATURE RANGE: 0 to 40 degrees Centigrade
AC POWER INPUT: 240 volts 10 amperes
COOLANT CAPACITY: 60 litres
WEIGHT: 250 kilograms

Well, there it is! An effective way of sinking many kilowatts of RF power or a great way to boil water — the choice is yours.

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Continued from page 24

frequencies were readable at TP5. All is well and working again!

The lesson here is, do not adjust any cores in transformers without first reading, marking and being fully aware of what to re-align. Do not use a metal tipped tool to adjust these small cores, they appear to be brittle and will chip easily.

One last modification has been done — a 240 volts AC fan has replaced the 12 volt one. It does a better job and keeps the final tubes much cooler.

Here's hoping for a little peace of mind for a while. For one who began in radio when crystal sets and reinartz detectors with reaction and audio were the state-of-the-art, and transistors and computers were unthought of, I still would not swap my FT102 despite all the inconvenience.

If anyone has one to sell cheaply, I will buy it for spare parts!

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LOW COST ANTENNA CONSTRUCTION IDEA

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A simple idea devised but, as yet, not constructed.

This is just an idea which I have devised but have not built a working model. It is a full wavelength loop for two-metres using a hula-hoop as a support for the antenna wire, which is threaded inside the hoop.

The hoop must be cut open so the correct amount of wire can be threaded through. Using the formula for quad loops, the correct wire length is about 2.1 metres. Dividing this figure by π (3.1416) the diameter that the hoop should be is obtained.

This calculates to be about 67 centimetres. If the circumference of the hoop is greater than 2.1 metres, a short section of the hoop should be sawn off and discarded. The amount to cut off will be π times (hoop diameter - 67 centimetres).

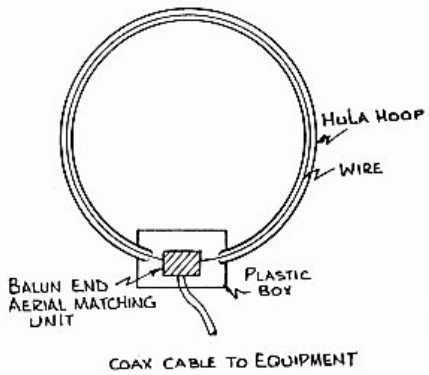

Figure 1:
Diagram of Hula-Hoop Aerial.

At the break of the hoop the 2.1 metres of wire should be threaded in. If there is not three or four centimetres of wire protruding from the ends of the hula-hoop, saw more off the hoop. A small plastic box is used to house the connections to the coaxial cable, a balun and possibly an aerial matching unit. It is important that the hoop-to-box join be sealed as any moisture entering this join will ruin the coaxial cable. It may be desirable to use coaxial cable, plugs, and sockets on the antenna.

Parasitic elements could be added using the same formulae as for quad aerials. The gain would be equal to a quad of similar size.

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TRACTOR MOBILE ANTENNA

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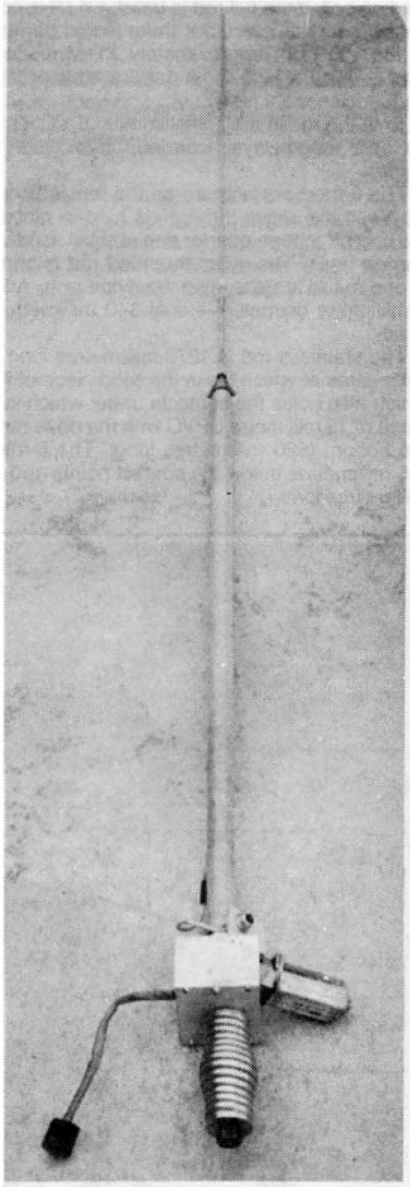


Operating "Tractor-Mobile" and changing bands "on the go" without having the tractor looking like a porcupine was quite a problem.

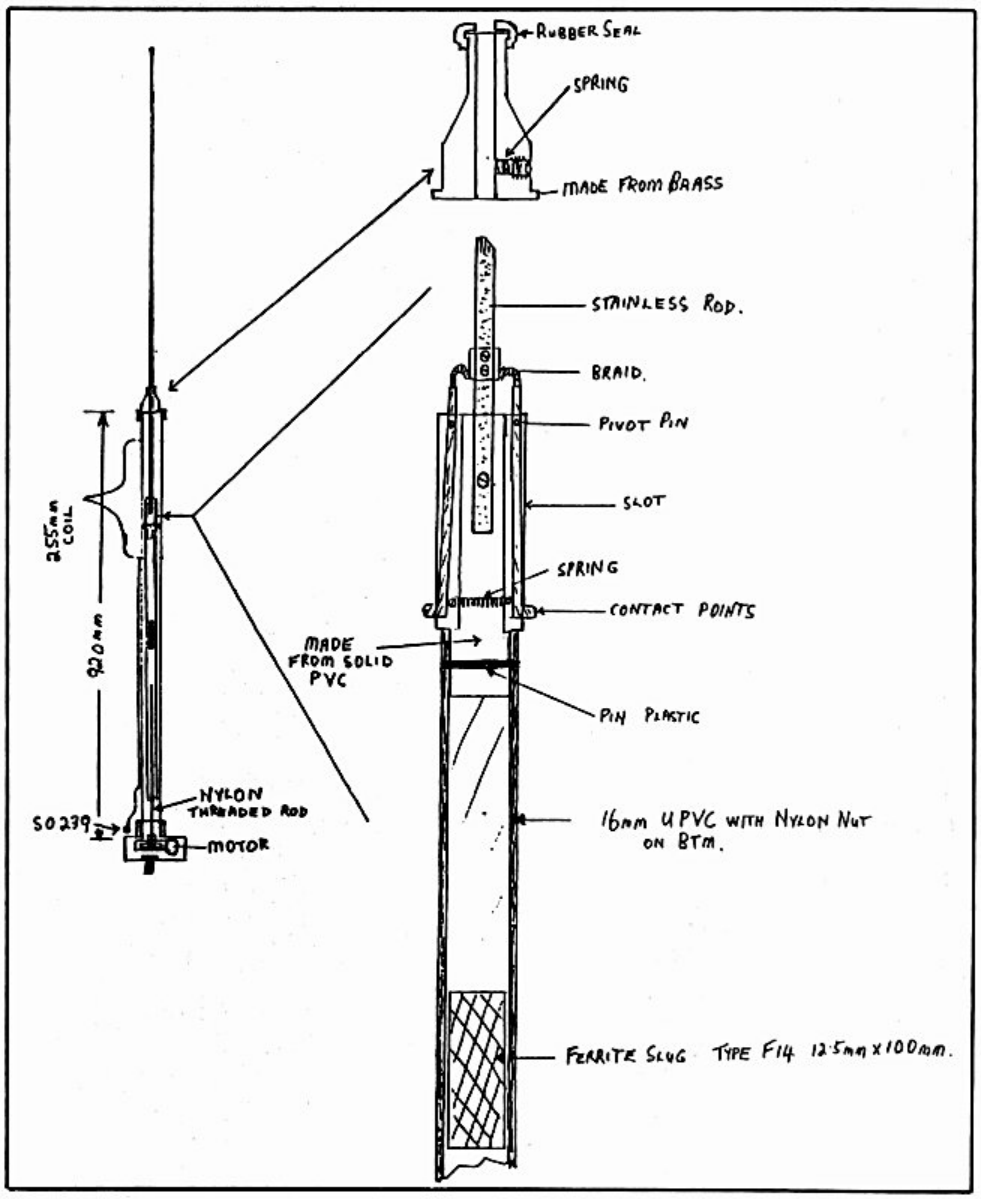
THE EXISTING ANTENNA required stopping the tractor to move the banana plug to change bands. After many months of thought and trial and error the antenna described below was designed. It is workable, practical and reasonably pleasing to the eye, and, most of all, seems to perform as well as any other six feet mobile antenna. On the highway it's wind resistance is low which was another consideration.

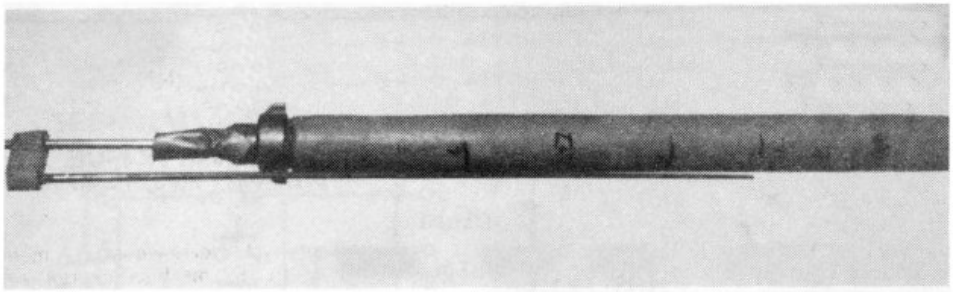
Whilst not exactly straight forward to construct, and initially some of the materials needed were difficult to obtain, it has been quite a challenge. With a working model in operation there are still many ideas and avenues to explore in order to produce the ultimate 3.5 to 30 MHz mobile antenna. Many of the components had to be made on a lathe so I enrolled myself in a metal machining course at the local TAFE college and, during the course, was able to make the parts required.

Essentially, the antenna has a loading coil which is just below centre and 25 millimetres in diameter. The top section is a piece of stainless rod, approximately one metre long (the bottom of a quarter-wave CB whip). Two contacts attached to the base of this stainless rod contact the loading coil from the inside through two slots cut in the PVC former. As the contacts are moved up the coil, loading is increased half a turn at a time and the top of the coil is, in turn, attached back to the stainless rod by a spring-contact so the overall length does also vary depending on the frequency in use at the time. As the frequency is lowered, the overall length increases as does the amount of loading coil in use and, after approximately 8 MHz is passed, a ferrite rod also begins to enter the coil from the bottom which helps keep the overall length of the coil down to 255 millimetres.

The impedance of the antenna does also vary depending on the frequency in use. 14, 10 and 7 MHz are around 15-20 ohms and 3.5 MHz is about 40 ohms. It appears the ferrite increases it!

From the solid PVC section, which is attached to the bottom of the stainless rod (it also supports the two contact points), a length of 16 millimetre





The Marker used to indicate which Frequency is in use.

UPVC is attached. This pushes or pulls the contacts up or down the loading coil. This is achieved by having a nylon nut glued to the bottom to accommodate a eight millimetre nylon threaded rod, which in turn is connected to the motor at the base.

The same piece of 16 millimetre UPVC also has the ferrite rod in it. The motor used is a window winder motor and reduction drive from a Mazda 929. The same antenna, without any ferrite rod, would operate from just below 7 MHz through to 30 MHz.

One problem encountered was to know what frequency it was last used on and whether it had to go up or down to achieve the required frequency. As a temporary measure a tip of a fishing rod was attached to the stainless rod and run down past the one inch diameter section. (It looks similar to a Gamma Match Rod!). This enabled making a mark for each band, which made tuning-up much easier and is so efficient that it is still being used.

ACTUAL CONSTRUCTION

Use 820 millimetres of 25 millimetre orange PVC and cut a shallow thread beginning 50 millimetres from one end. Make the thread to accommodate 18 SWG tinned copper wire at 1.75 millimetres pitch and 260 millimetres long. Next, cut two slots, 1.5 millimetres wide, opposite each other from the top through to the bottom of the windings. These are where the contacts run and contact the coil from the inside. They also stop the top section rotating when the motor is running. A 25 millimetre diameter brass tube, threaded from a plumbing shop — 70 millimetres goes on the base end and 25 millimetres length on the top of a piece of three-quarter UPVC is put inside to hold the slots open and glue on the brass ends. Next, solder the wire to the top brass fitting and wind the loading coil. Run the wire down the base and solder to a banana plug socket at 25 millimetres above the base of the orange PVC.

The next step is to run some glue onto the windings each side of the slots, ensuring none goes into the slots, then wrap some tape over each slot. It is now ready to fibreglass over the entire coil and the PVC and brass ends leaving 11 millimetres of thread out at the top and 28 millimetres at the bottom. Several layers of glass are required so the three-quarter PVC can be removed without the slots closing up.

The ferrite rod is Type F14 and 12.5 by 200 millimetres. If only half the rod is used 3.5 MHz is reached and, on frequencies above approximately 8 MHz, there would be no ferrite in the loading coil. If the full rod is used, 1.8 MHz could possibly be achieved, but there would be ferrite in the coil from approximately 21 MHz down. How the rod would affect performance at those frequencies is unknown.

To fit the rod in the 16 millimetre UPVC it must be split lengthways, inserted, then glued up again.

The turned brass piece on the top, which the stainless rod slides through, is held in place by the ring off a three-quarter ring and tail used on a garden hose. The nylon threaded rod is bought in one metre lengths, also the nylon nuts. I used 8 millimetre diameter — only 340 millimetres is used.

The stainless rod is 1270 millimetres long, 30 millimetres of which fits in the solid piece of PVC which also holds the contacts under which is the piece of 16 millimetre UPVC with the drive nut on the bottom (520 millimetres long). The ferrite is 115 millimetres below the contact points and 100 millimetres long.

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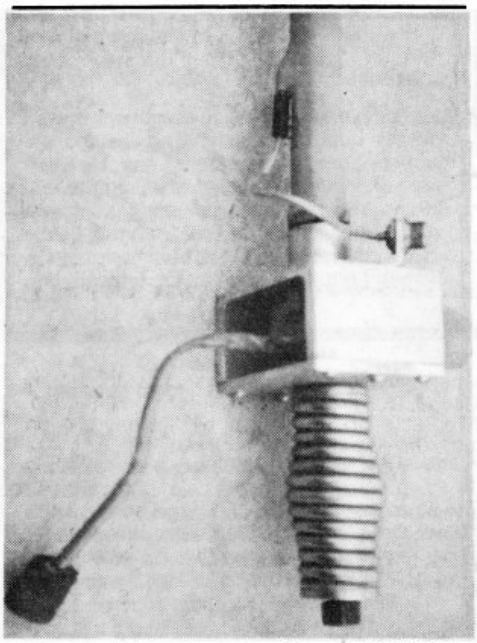

The Base of the Antenna. Note the SO239 to connect the coaxial cable.

CW Five-Watt, One Valve QRP Transmitter

Peter Parker VK6NNN
Aged 15
C/- PO Witchcliffe, WA. 6288

Frequencies between 3.525 and 3.550 are more appropriate.

This transmitter uses a 6GV8 triode-pentode valve, is crystal controlled and has an output power of approximately five watts, which is sufficient for worthwhile results even with a G5RV antenna only four metres in height. It has very good keying characteristics and does not produce TVI if properly operated.

The original circuit was published in the 1973 *ARRL Handbook*, page 169, using a 6T9. It can be used from 160 to 20 metres by changing the coil in the pi-network. Other triode-pentodes, such as the 6GW8, 6DX8, and similar tubes could be used in the QRP transmitter provided the connections on the valve-holder are changed to suit the valve at hand.

This transmitter should not cost any more than about $5-10, if you have a few old televisions and radios for salvaging parts.

The 3.580 MHz crystals can be bought for abut $3, but other frequencies have to be obtained by asking around on-air.

You will receive very little response by calling CQ on 3.580 MHz with CW. Frequencies between 3.525 and 3.550 Mhz are more appropriate.

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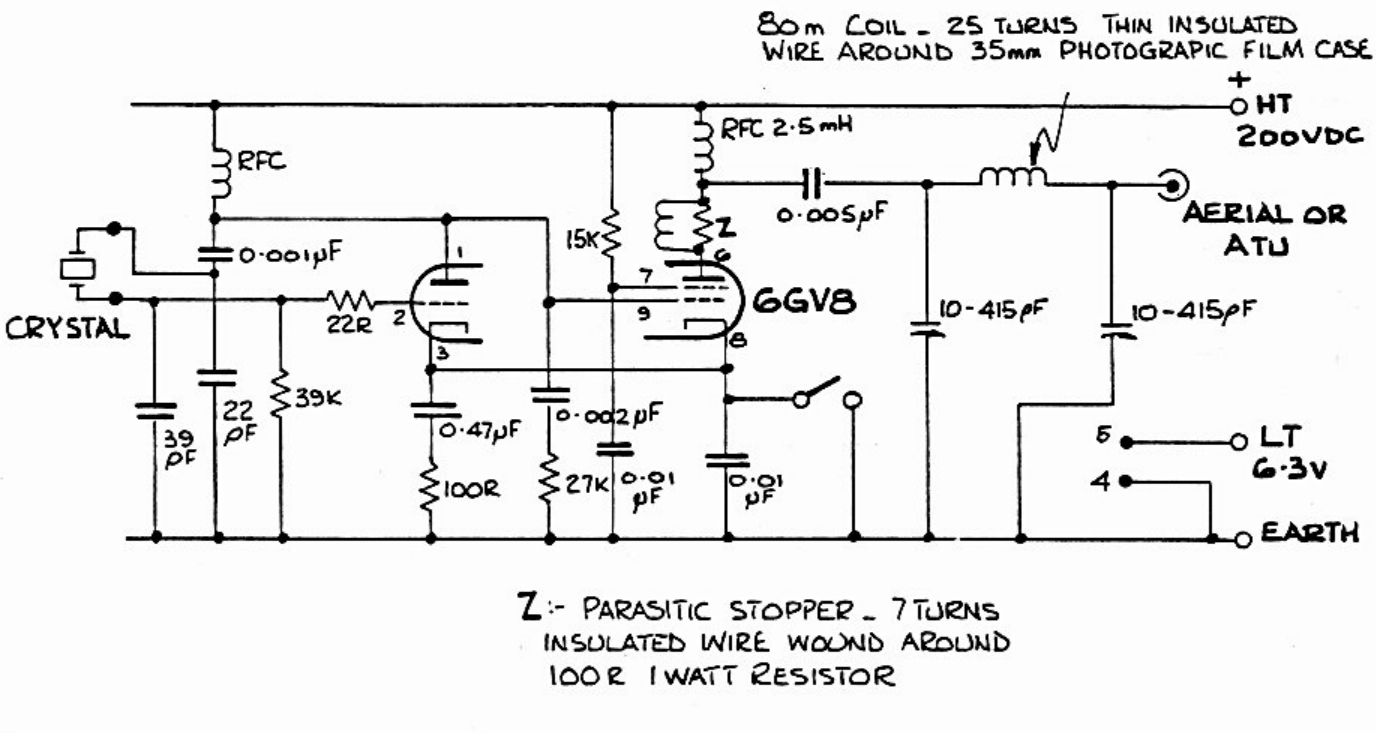
Figure 1: Circuit Diagram.



Continued from page 5

as they were all practically evaluated on a scope.

CONCLUSION

No building or adjusting filters, as is the case with RTTY.

LCT works immediately.

NOTE

The Author and Designer, Peter J Cox PA3DSX, has the following additional comments.

1Instead of spending hours or days of trials and errors, begin with the time honoured method of "kitchen to shack" contacts, using two sets. This makes for easy adjustments. Then, extend the range.

2Use "squelch IN" and do not talk if you use the method of inserting the computer output after the first audio stage. If you do talk or make other noises, unwanted pulses may occur.

TRANSLATOR'S COMMENTS

This inexpensive method should also allow different brands of computers to communicate by using BASICODE. This system, now in its second version, caters for most of the popular brands, even the local Microbee (for information, refer to Microbee Clubs). BASICODE was 'invented' by enthusiasts with Hobby Scope, a weekly program on Dutch radio. Programs are broadcast by this method on both the AM and FM broadcast stations in the Netherlands. Besides computers, Hobby Scope caters for other 'hobby disciplines.' Attempts to have the ABC interested in such a program fell on deaf ears, probably the suggestion came from Brisbane, not from Sydney. But that is my own impression.

For further information, send a SASE (ie with IRCs) to Radio Netherlands, Basicode Section, Hilversum, Holland. The price is reasonable, even considering the present dollar value.

—Translated from *Electron* June 1986, by John Aarsse VK4QA

TOPICAL TECHNICALITIES — 2

Lindsay Lawless VK3ANJ
Box 112, Lakes Entrance, Vic. 3909

Almost all coupling networks can be analysed.

Prompted by my "Lazy Pi" article in AR July 1986, Graham Ranft VK7ZO, wrote to me about another coupling circuit which has interesting possibilities. it is the 'Series Parallel' network described by Warren Bruene W5OLY, in *QST* June 1986.

The circuit is shown in **Figure 1** as drawn by Warren. At Figure 1(a) and (b) I have redrawn the circuit to show that it can be regarded as two L- networks in tandem. Warren's analysis is, of course, correct but I prefer the tandem-L representation. As further proof of the adage 'nothing is new,' my 1937 vintage course notes name the arrangement the Tee-Pi network. Take your pick 'Series-Parallel', 'Tandem-L' or 'Tee-Pi'.

The 1937 notes provide additional information:
Referring again to Figure 1:

$$X_1 + X_2 + X_3 = 0 \text{ and}$$

$$X_1/X_3 = X_2/X_4 = -n \text{ so that —}$$

X_1 is opposite sign to X_3 and X_2 is opposite sign to X_4.

Almost all coupling networks can be analysed or designed using the basic L-network theory. At Figure 2(a) between the points a-a is a parallel combination of load resistance (eg aerial system) $R_a = nR_o$ and reactance X_b. There is an equivalent series circuit for this (Figure 2(b)) and there is a value for X_b which will cause the equivalent series resistance to equal the source resistance R_o (eg the required load for a transmitter or linear).

The equivalent series R is

$$R_a X_b^2/R_a^2 + X_b^2$$

and the equivalent series reactance is

$$\pm j(R_a^2 X_b/R_a^2 + X_b^2$$

$R_a = nR_o$ therefore,

$$nR_o X_b^2/n^2 R_o^2 + X_b^2 = R_o$$

Solve this for X_b

$$X_b = \pm nR_o/(n-1)^{1/2} \quad \ldots(1)$$

X_a has to resonate the circuit therefore:

$$X_a = \pm j[R_a^2 X_b/R_a^2 + X_b^2$$

and substituting nR_o for R_a:

$$X_a = \pm R_o(n-1)^{1/2} \quad \ldots(2)$$

If you want further proof of the power of maths try solving that circuit for the case $R_o = nR$.

A similar manipulation but transforming the series circuit Figure 2(c) to an equivalent parallel circuit and assuming $R_o = nR_a$ produces:

$$X_b = \pm R_o/(n-1)^{1/2} \quad \ldots(3)$$

$$\text{and } X_a = \pm (n-1)^{1/2} R_o/n \quad \ldots(4)$$

With the results (1), (2), (3) and (4) it is possible to design or analyse any coupling circuit configuration for any required impedances transformation by assuming that all are tandem-L networks.

Figure 2.

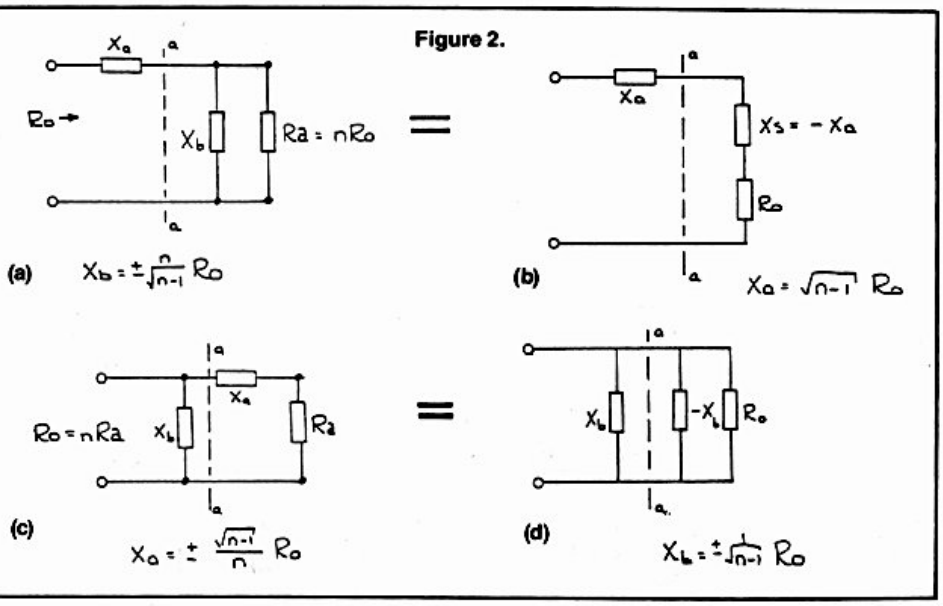
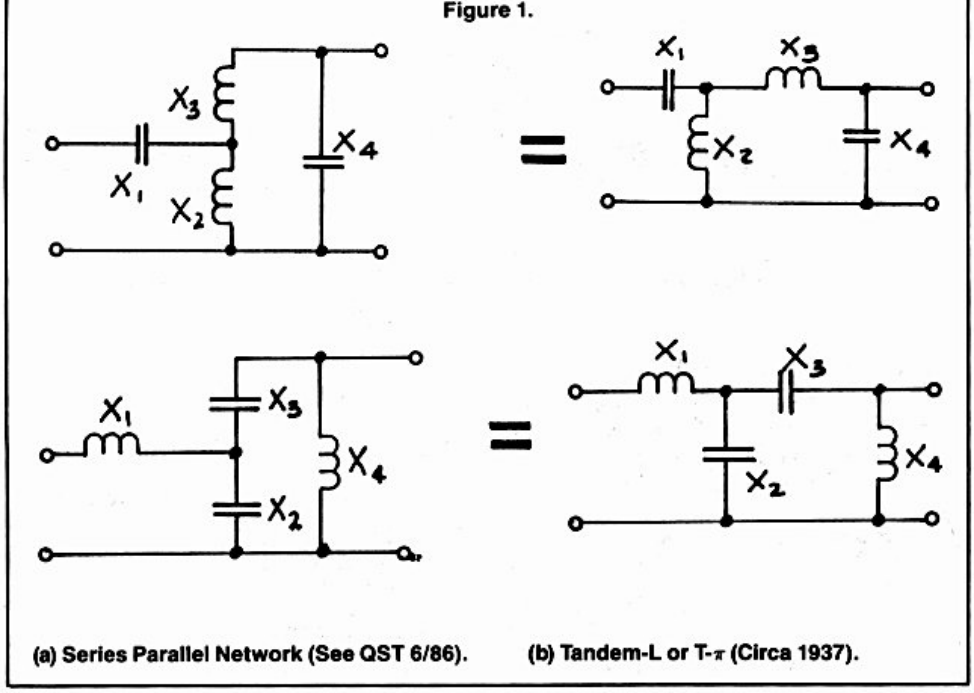


Figure 1.



(a) Series Parallel Network (See QST 6/86). **(b) Tandem-L or T-π (Circa 1937).**

The maths abbreviated above might not be attractive to many but it is the only way to obtain a proper understanding and thus be able to avoid the trap of buying black box couplers or constructing units from recipes, which are power absorbers as well as (and sometimes instead of) aerial coupling units (often wrongly called aerial tuning units).

Also, as a follow up to the 'Lazy Pi' article, Reg VK3CCE, told me about a method of choosing the best length feeder for 'tuned feeder' systems. The information comes from a letter to the QRP Club from Fred Bonavita W5OJM and also rates a mention in *CQ* July 1986, in the "This 'n' That" column by W8FX. The idea is to use lengths (in feet) of feeders plus half aerial length which, when divided by a specified divisor produce an answer which is not a whole number and preferably close to a number plus 0.5. The divisors are:

16 for 80, 40, 20 and 10 metres.
22 for 15 metres and
9 for 16 and 12 metres.

Reg uses a horizontal aerial half length 41 feet and feeder length 34 feet. Applying the divisors:

75 ÷ 16 = 4.7
75 ÷ 22 = 3.4
75 ÷ 9 = 8.3

The aerial passes the test for all bands and Reg says it works well.

er

HIGH VOLTAGE CAPACITOR CHECKER

Peter O'Connell VK2EMU
3A Algernon Street, Oatley, NSW. 2223

A simple capacitor checker from bits and pieces.

Recently, I had a high voltage power supply for a valve transceiver blow a capacitor. So what? — you may ask — except that it was less than 18 months old.

While looking around for a replacement, I heard some stories that the voltage rating on some capacitors are not to be trusted. It appears that 500 VW capacitors have been known to "blow-up" when as little as 350 volts has been applied to them.

I constructed the high voltage stepped power supply shown in Figure 1. The transformer was from an old black and white television which had been discarded with a neighbour's rubbish. The capacitors and resistors were from a bulk package bought at a trash and treasure sale. A single high voltage capacitor could also be used if available.

The supply has output voltages of 0, 25, 50, 75, 100, 200, 300, 400 and 500 volts. By connecting between two terminals, voltages from 0 to 500 volts can be obtained in 25 volt steps, ie by connecting between the 50 and 300 volt terminals, a voltage of 250 volts is obtained.

To test a capacitor, connect it to 25 volts and measure the leakage current flowing through the capacitor. Step the voltage up in 25 volt steps until the required rating is reached. If the leakage current has not increased greatly, or the capacitor has not gone BANG!!!, then it should be okay.

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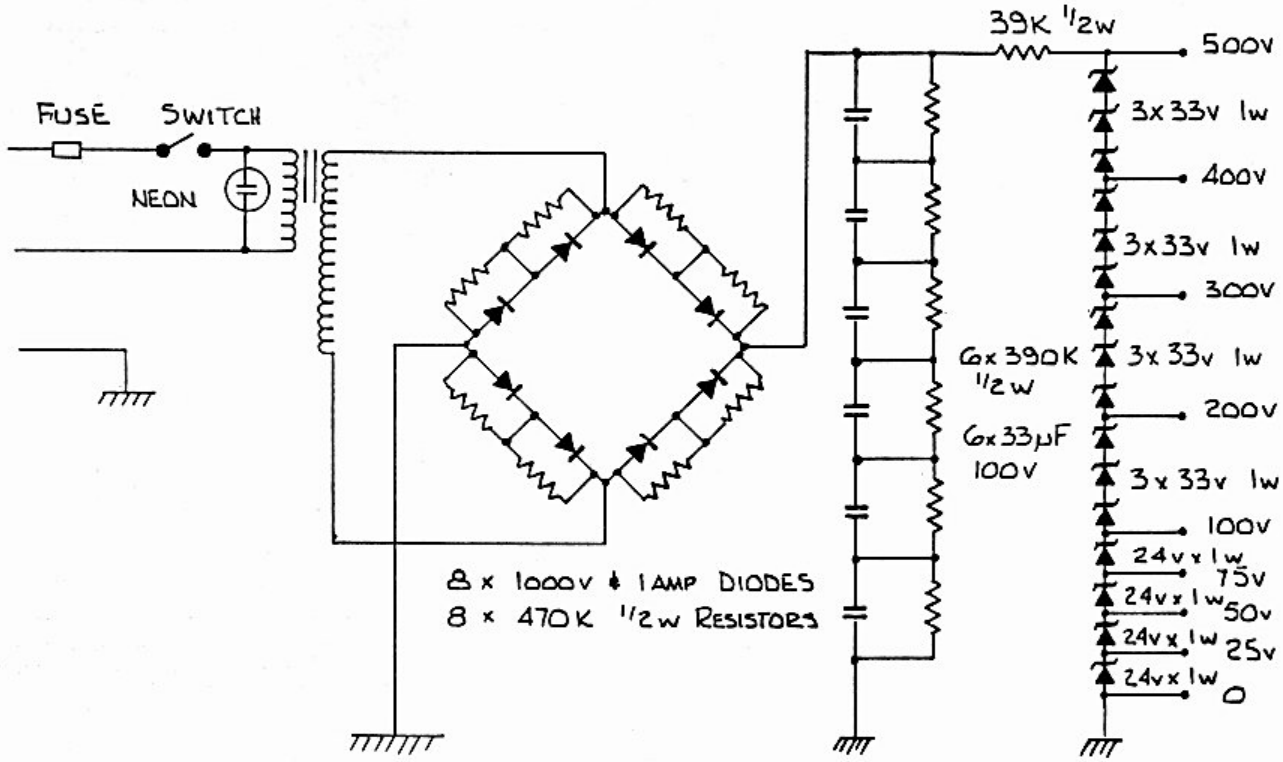
Figure 1 — Circuit of Capacitor Checker.



SIMPLE SIX-METRE VERTICAL

Peter O'Connell VK2EMU
3A Algernon Street, Oatley, NSW. 2223

Why pay a small fortune for an aerial for an old pre- loved car phone?

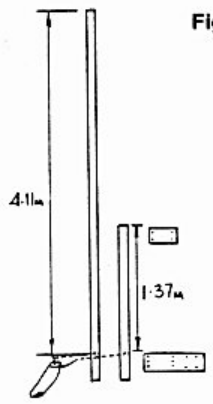
Having paid $5 for an old valve car phone, converted to 52.525 MHz, I was not going to spend a lot of time and effort building an antenna for it — I have modified a J-antenna from the *ARRL FM and Repeaters* book.

Whereas the original was a combined two and six metre aerial, this is only for six metres. I also decided to use 25 mm square aluminium tubing as it is easier to drill and screw. There are also little square lugs available that close off the ends.

The entire antenna is constructed with pop-rivets and self-tapping screws — including the coaxial cable! The only other materials required are some scrap aluminium plate and a piece of perspex. The SWR is about 1.1:1 at 52.525 MHz, and it works quite well.

ar

Figure 1.



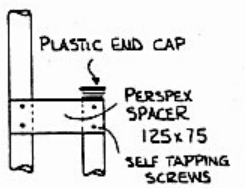


Figure 2.

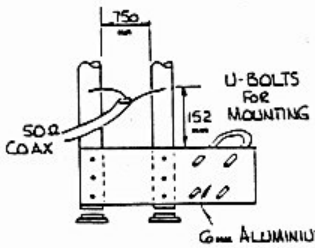
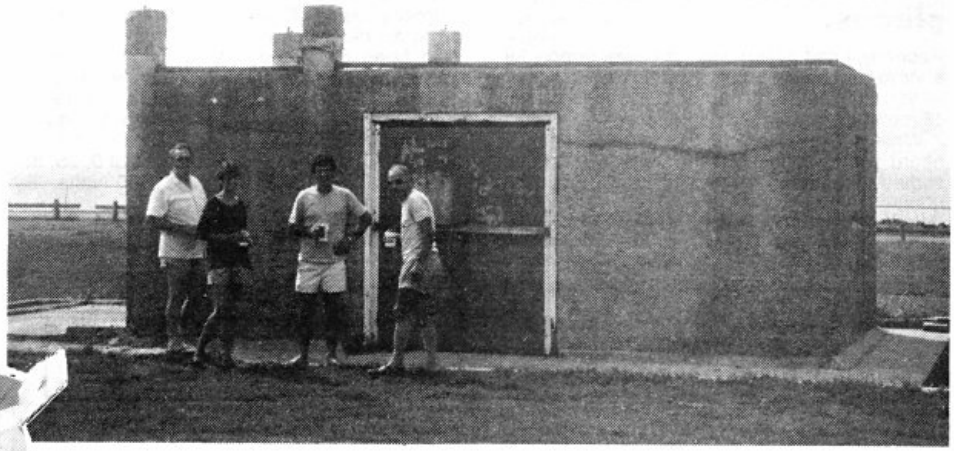


Figure 3.

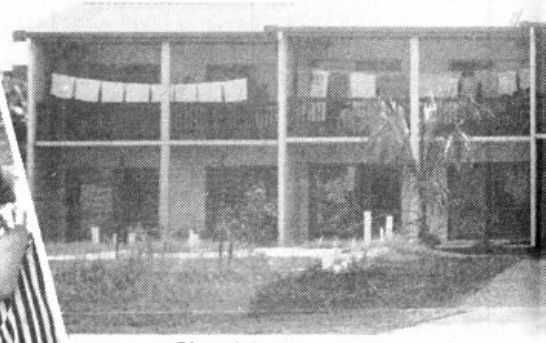
A PICTORIAL VIEW OF THE DAR
21ST BIRTHDAY

Visitor Doug VK3UM, cuts the Birthday Cake.



East Point Reserve — Site of the First Beacon, VK8VF.

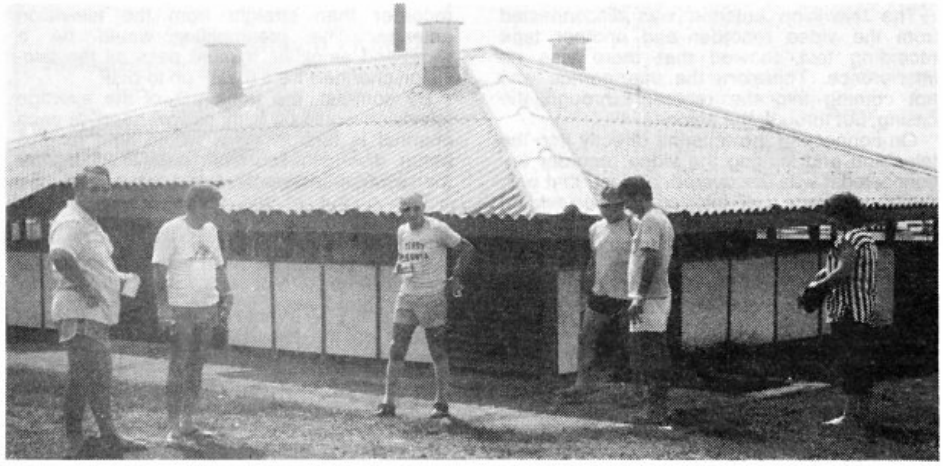
Preparing for the "Mystery Bus Trip", from left: Frank VK8FT, Terry VK8TA, Doug VK3UM, Barry VK8DI, Ray VK8RB, Bill VK6AOD, Natham and Korin (harmonics of VK8BN and VK8YL), Garry VK8BN and Wendy VK8YL.



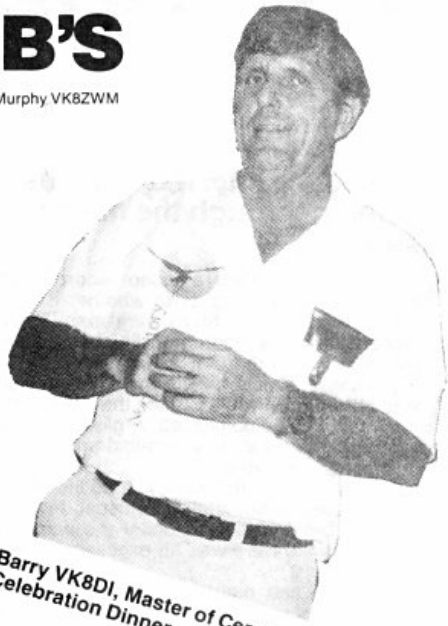
Site of the first meeting at Nightcliff (la Cyclone

RWIN AMATEUR RADIO CLUB'S CELEBRATIONS

Photographs courtesy Bill Murphy VK8ZWM

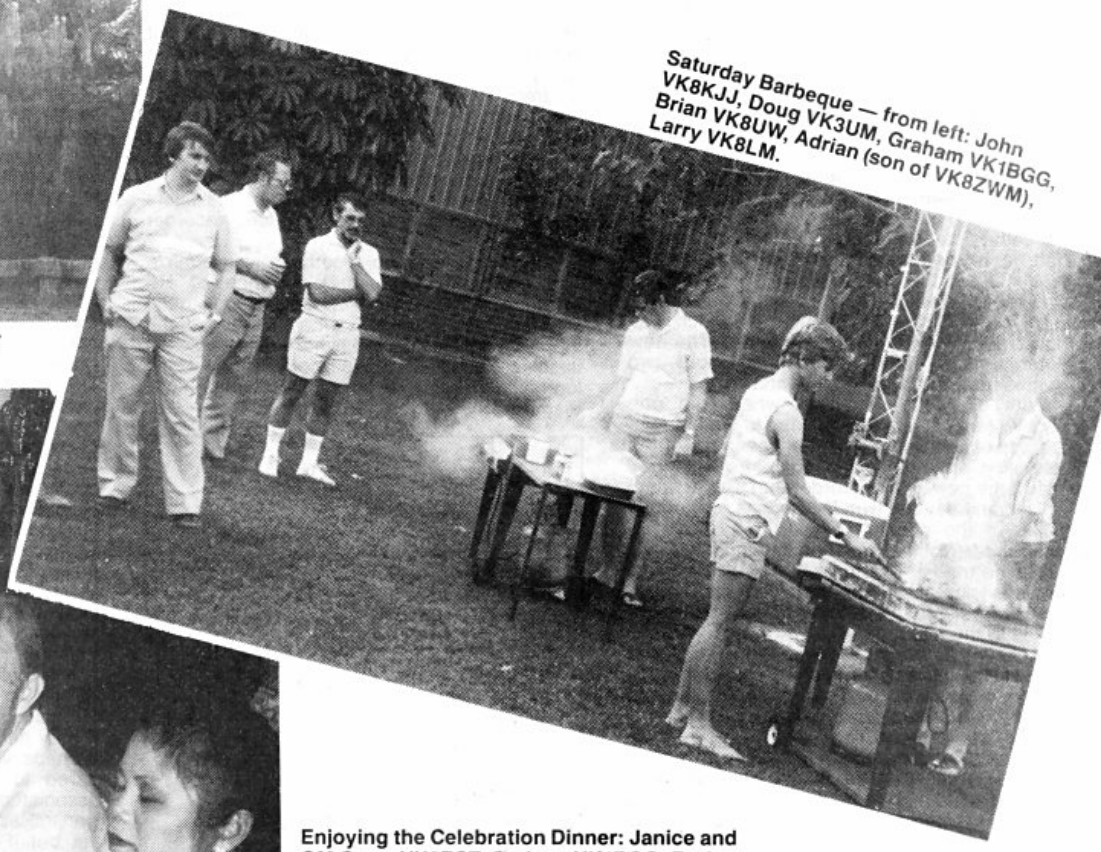


East Point Reserve — Old Meeting and Transmitting Site.



Barry VK8DI, Master of Ceremonies for the Celebration Dinner.

(late VK8BB). The building was rebuilt after
ne Tracey.



Saturday Barbeque — from left: John VK8KJJ, Doug VK3UM, Graham VK1BGG, Brian VK8UW, Adrian (son of VK8ZWM), Larry VK8LM.

Enjoying the Celebration Dinner: Janice and OM Garry VK8ZGT, Graham VK1BGG, Ruth and OM Henry VK8HA (partially hidden), Robin and OM Ray VK8RB, Ron VK3AUR, Jim VK8JJ and wife Gloria.

A Video Recorder TVI Case History

Karl Saville VK5AHK
2 Wood Street, Lobethal, SA. 5241

Maybe the interference was coming through the mains supply!

I recently purchased a video recorder after much soul- searching as to whether it was a waste of money. As there were many advantages to having a recorder — like being able to receive SBS on the UHF band without having to purchase a new television — the decision was made to go ahead, after the "Minister of the Interior" was convinced. A gleaming black video recorder was duly installed on top of the lounge room television.

Now it is law, in this complicated life of ours, that whenever something unusual happens, you can bet your bottom-dollar the cause will not be simple. Here was an excellent example of this law.

The very first night I was on air, after the installation, I received a stern memo from the "Minister of the Interior" to the shack protesting that I was interfering with the television. Not just the television, but *her* television. I closed the station down at once.

Previously there had been no complaints of any TVI. (One is very dependent on reports of this nature as it is very difficult to watch the lounge television from the shack and transmit at the same time!) Knowing the Minister as I do, any interference to the regular nightly serials would not be tolerated.

What made the problem more difficult was that, just prior to the delivery of the video recorder I had erected a new 80 metre antenna. I had managed to buy a large reel of surplus green plastic covered earth wire and though it was about time to put up a decent antenna system, instead of the multi- coloured house-wiring one which had served so well. At the same time, A balun and coaxial line feeder had been fitted instead of a figure eight twin feeder. Also, the old television VHF antenna was replaced with a new all- band antenna to receive the SBS UHF channel — which was now available with the new recorder. The new antenna was unfortunately only about two metres from the 80 metre antenna!

With all these variables, where did one begin? Was the interference due to the fitting of the coaxial cable? Was it the closeness of the television antenna to the 80 metre antenna? Was it the new video recorder that was at fault?

The next day the twin feeder was returned in place of the coaxial feeder — it made no difference. (Not that I really expected it to!).

Maybe the HF interference was coming into the television and recorder through the mains. There were a couple of television scanning coil yokes in the junk box — so with these two HF mains chokes were made up with the power leads to the television and video recorder.

Another test, but still plenty of interference on both sound and vision. Three large bands across the screen. The video recorder was very useful for carrying out interference tests. A tape recording can be made of a television channel while a HF transmission is made from the shack. Upon playing the tape back a study of the interference can be made!

Back to the TVI! Was the interference coming directly into the video recorder or was it coming from the antenna? As TVI had never been experienced before, the television antenna system was not a suspect!

The television antenna was disconnected from the video recorder and another tape recording test showed that there was no interference. Therefore the interference was not coming into the recorder through the casing, but through the antenna.

On connecting the antenna directly into the television and leaving the video recorder unconnected it was discovered, on test, that only the faintest trace if HF interference was evident on the television — a few swiggly lines were seen and these were not enough to cause any complaints.

What to do? Throw the video recorder away? The ARRL Handbook was consulted. In the interference section was a description of a high pass filter for TVI from HF transmitters. Three capacitors in series, 50 pF, 100 pF, 50 pF and two three-turn HF inductances connected from the junction of the capacitors to earth. Looked interesting!

The television antenna was cut about three inches from the terminating input plug and the filter was soldered in series with the feeder inner lead.

Wonder, upon wonders, it worked like a charm. No suggestion of any interference whatsoever. Now I can turn the wick up!

The problem could have been left at this stage, put down to being one of those rare complete success stories that one has in life. I could have rested on my laurels, as it were, but interest in filters had been aroused, so much so, in fact, that a computer program was made up from the data and formulae given in the ARRL Handbook, so that any two to 10 element high or low pass filter can be solved and the attenuation of any frequency from the design cutoff frequency given.

It was the attenuation aspect of the filters which caused a return to the video recorder problem.

Why had the video recorder given such a bad performance in the presence of HF, whereas the television on it own was quite satisfactory? There was not a circuit of the input of the recorder, but one could make an intelligent guess at what a block diagram would look like. Figure 1 gives a possible block diagram.

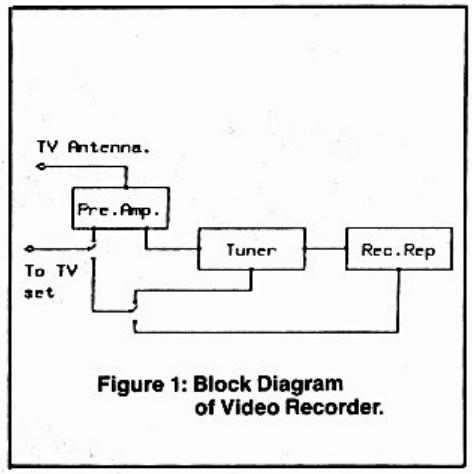


Figure 1: Block Diagram of Video Recorder.

Firstly, the antenna input was fed into the preamplifier. It had been noticed that the signal was stronger when fed through the video recorder than straight from the television antenna. The preamplifier would be a wideband amplifier. It must pass all the television channels from 0 VHF up to UHF.

By contrast, the front end of the average television would be fairly narrow band; ie each channel is tunable. This would tend to give better discrimination from interfering signals than a wideband input.

The output of the video preamplifier is connected to the video tuner and recorder. There are three possible modes that the television set can be used with this particular recorder.

1. Replay — Whatever is on the tape will appear on the television in this mode if the television set is switched to Channel 0.

2. Record — The video recorder records from its own tuner and the television is connected to a second outlet from the video recorder preamplifier if you wish to watch another channel.

3. Video Tuner — When connected to the video tuner, the television set is switched to Channel 0 and the station selection, VHF or UHF, is made on the recorder.

It seemed to be clear that the video recorder's preamplifier was the guilty party. Being wideband, the front end was being swamped by the excessive HF transmitting signal picked up from the amateur 80 metre antenna.

Television reception at Lobethal is not the best and the television signal could be anything from 100 to 500 microvolts.

If you are in a low television signal area and your amateur antenna is fairly close, say within 30 metres, to the television antenna, there could be just as much amateur signal appearing on the television screen as the television program.

A five element filter as recommended in the *ARRL Handbook* would have an attenuation of about 120 dB at 3.600 MHz, which is a ratio of 1 000 000. An interfering signal of one volt would be reduced to just over one microvolt. There should not be any interference with a television program from such a small signal even in a low television signal area.

The satisfactory conclusion to this interference problem has given the writer much confidence for an ability to cope with suspicious neighbours. The sight of an antenna farm does not bring out the best in neighbours and any interference is frequently blamed on the radio amateur next door. Until all television sets are fitted with adequate filtering in the input there are bound to be amateur signals picked up when antenna systems are too close together.

It is quite possible that neighbours to this QTH suffer from some interference on their television screens from amateur transmissions. It may be only a few lines over the picture or perhaps worse — and maybe they are prepared to tolerate it. Maybe they have not associated their interference with amateur transmissions. There have been no complaints yet but if there is I will, with the utmost of confidence, demonstrate the complete absence of interference on my own set. They will also be advised why there is no interference. . .

ar

THREE FILTERS

R Schestavin VK5RC
48 Burlington Street, Walkerville, SA. 5081

The prices of integrated circuits being quite low, it is very cheap and convenient to use active filters for amateur audio applications.

After being out of school for many years, the algebra becomes a bit "rusty" and it takes considerable time to work out and check the formulae and results of calculations.

This is a simple BASIC program to work on a Microbee computer for three types of filters, namely: *Highpass, Lowpass* and *Narrow Bandpass*. These filters are very useful for RTTY, Packet Radio Speech Filters, etc.

Two-pole active filters have a gain of unity and the Q is taken as .707 as used in Butterworth filters which have the flattest response for the passband.

To realise a wide bandpass filter highpass and lowpass filters are connected in series. For a narrow band one, a two-pole filter is sufficient (say for 170 Hz shift and 200 Hz shift, or CW).

One should disregard the right-hand decimal places as produced by the computer, of course, and use the nearest available preferred values. During the tests the response can be "trimmed." If no measuring equipment is available, one should use components as near as possible to those calculated.

If linear amplifiers, with balanced supply, are used, the positive inputs can be grounded (no bias required), If a single sided power supply is used, the positive inputs have to be connected to a voltage divider.

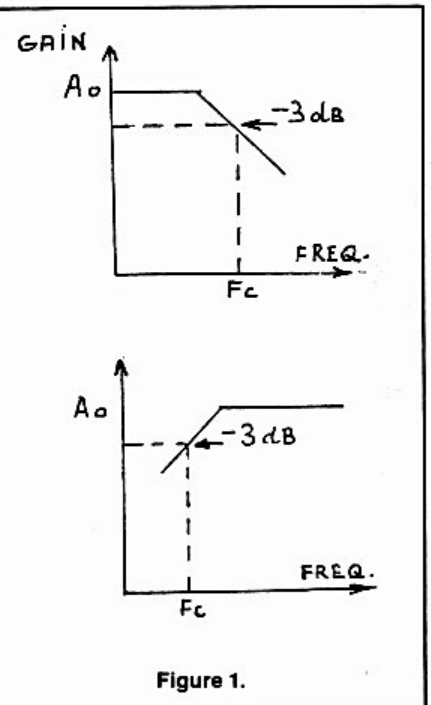


Figure 1.

```
00100 PRINT TAB10;"DESIGN OF 2 POLE ACTIVE FILTERS"
00110 PRINT TAB10;"==============================":PRINT
00120 REM:ASSEMBLED BY R.SCHESTAVIN VK5RC
00130 PRINT "WHICH FILTER?  Type H for HIGHPASS"
00140 PRINT TAB21;"L for LOWPASS"
00150 PRINT TAB21;"B for NARROW BANDPASS"
00160 A0$=KEY$: IF A0$="" THEN 160
00170 IF A0$="H" OR A0$="h" THEN 200
00180 IF A0$="L" OR A0$="l" THEN 480
00190 IF A0$="B" OR A0$="b" THEN 730
00200 PRINT:PRINT "Is printed copy req-d? Type Y (yes) or (no)"
00210 B0$=KEY$: IF B0$="" THEN 210
00220 IF B0$="Y" OR B0$="y" THEN 240
00230 IF B0$="N" OR B0$="n" THEN 250 ELSE 200
00240 OUT#1 ON
00250 PRINT
00260 PRINT TAB 25; "HIGHPASS FILTERS"
00270 PRINT TAB 25; "================":PRINT
00280 PRINT "Q=.707 (BUTTERWORTH)"
00290 Q1=0.707
00300 PRINT "GAIN A0=1"
00310 PRINT "SELECT R3=220000 Ohm": R3=220000
00320 INPUT "SUPPLY VOLTAGE    ?";V1
00330 INPUT"CUT OFF FREQUENCY Fc     ?"; F1
00340 R2=((V1/2.6)-1)*R3: PRINT "R2="; R2; " Ohm"
00350 INPUT "ENTER NEAREST PREFERED VALUE";R0
00360 PRINT "LET C1=C2"
00370 C1=.707*3/(6.28*F1*R0*(10^-12))
00380 PRINT "C1=C2=";C1; " pF"
00390 R1=1/(.707*6.28*F1*C1*3*10^-12)
00400 PRINT "R1=";R1; " Ohm"
00410 PRINT
00420 PRINT "SELECT NEAREST PREFERED VALUES":PRINT
00430 OUT#1 OFF: PRINT
00440 PRINT "Do you wish to repeat? Y or N"
00450 C0$=KEY$: IF C0$="" THEN 450
00460 IF C0$="Y" OR C0$="y" THEN 200
00470 IF C0$="N" OR C0$="n" THEN 1030
00480 PRINT:PRINT "Is printed copy req-d? Y (yes) or N (no)"
00490 D0$=KEY$: IF D0$="" THEN 490
00500 IF D0$="Y" OR D0$="y" THEN 520
00510 IF D0$="N" OR D0$="n" THEN 530 ELSE 480
00520 OUT#1 ON:PRINT
00530 PRINT TAB 30; "LOWPASS FILTERS"
00540 PRINT TAB 30; "==============":PRINT
00550 PRINT "Q=.707 (BUTTERWORTH), GAIN A0=1"
00560 Q1=.707:A0=1
00570 K1=1/4*Q1^2*(A0+1)
00580 INPUT "ENTER SUPPLY VOLTAGE?";V1
00590 INPUT "ENTER CUT OFF FREQUENCY F1";F1
00600 INPUT "Enter convinient value of C1, in pF?";C1
00610 PRINT "C1=" ;C1; " pF"
00620 C2=K1*C1:PRINT "C2="; C2; " pF"
00630 R2=1/(2*Q1*6.28*F1*C1*K1*(10^-12))
00640 PRINT "R2="; R2 ; " Ohm"
00650 R3=R2/2: PRINT "R3="; R3; " Ohm"
00660 R1=R2/1: PRINT "R1="; R1; " Ohm"
00670 R4=(R2+R3)/((V1/2.6)-1): PRINT "R4="; R4; " Ohm"
00680 OUT#1 OFF: PRINT
00690 PRINT TAB 25; "Do you wish to repeat? Type Y or N"
00700 F0$=KEY$: IF F0$="" THEN 700
00710 IF F0$="Y" OR F0$="y" THEN 100
00720 IF F0$="N" OR F0$="n" THEN 1030
00730 PRINT: PRINT TAB 15; "NARROW BANDPASS FILTERS"
00740 PRINT TAB 15; "====================":PRINT
00750 PRINT:PRINT "Is printed copy reuired?"
00760 PRINT "Type Y (yes) or N (no)"
00770 E0$=KEY$: IF E0$="" THEN 770
00780 IF E0$="Y" OR E0$="y" THEN 800
00790 IF E0$="N" OR E0$="n" THEN 810 ELSE 750
00800 OUT#1 ON: GOTO 810
00810 PRINT TAB 15; "NARROW BANDPASS FILTERS"
00820 PRINT TAB 15; "======================":PRINT
00830 PRINT "TO MINIMIZE LOADING EFFECT OF THE IC"
00840 PRINT "R4 SHOULD BE UNDER 24k - 22000 IS CHOSEN"
00850 R4=22000
00860 INPUT "ENTER F0 in Hz (CENTER FREQUENCY)?"; F0
00870 INPUT "ENTER BANDWIDTH REQUIRED in Hz?"; B0
00880 INPUT "ENTER SUPPLY VOLTAGE?"; V1
00890 Q1=F0/B0
00900 R3=((V1/2.6)-1)*R4: PRINT "R3="; R3; " Ohm"
00910 R1=R3/2: PRINT "R1="; R1; " Ohm"
00920 LET C1=C2
00930 C1=Q1/(6.28*F0*R1*10^-12):PRINT "C1=C2="; C1 ; " pF"
00940 R2=Q1/((2*Q1^2-1)*6.28*F0*C1*10^-12)
00950 PRINT "R2=" ;R2; " Ohm"
00960 PRINT "R4=22000 Ohm"
00970 OUT#1 OFF: PRINT
00980 PRINT "REPEAT BANDPASS FILTERS??"
00990 PRINT "Type Y (yes) or N (no)"
01000 A0$=KEY$: IF A0$="" THEN 1000
01010 IF A0$="Y" OR A0$="y" THEN 730
01020 IF A0$="N" OR A0$="n" THEN 1030: PRINT
01030 PRINT TAB20; "*** GOOD-BYE FOR NOW ***"
01040 END.
```

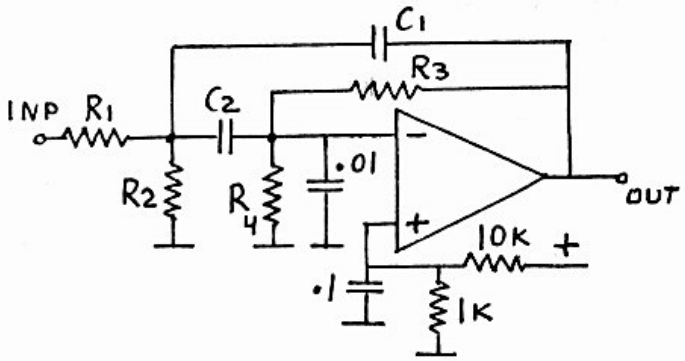


Figure 2: Narrow Passband Filter.

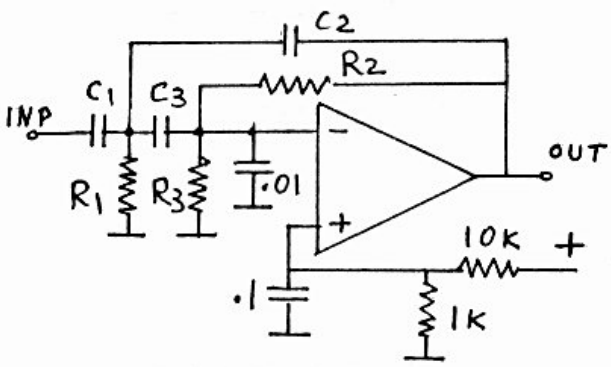


Figure 3: Highpass Filter.

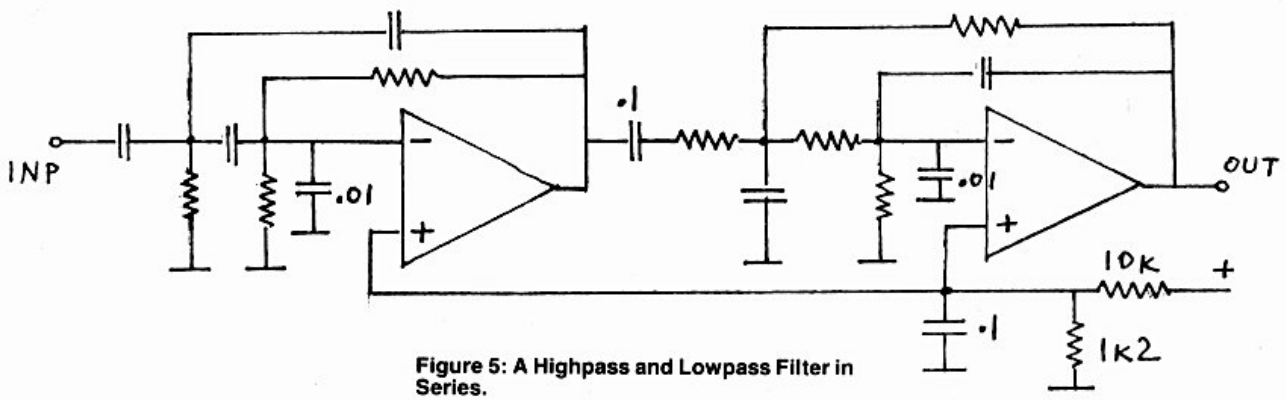


Figure 5: A Highpass and Lowpass Filter in Series.

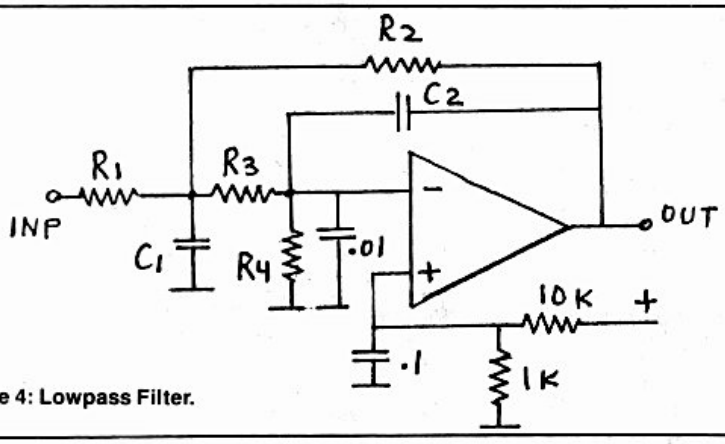


Figure 4: Lowpass Filter.

The bias on the positive input has to be adjusted, so that the DC on the output is equal to half the supply voltage. In practice, it will be found that the DC on the negative and positive inputs will be equal.

It should be pointed out to those who are unfamiliar with the terms used that, the corner or cut-off frequency is the frequency at which the gain is 3 dB down comparing to the passband gain. See Figure 1.

Uncompensated linear amplifiers often exhibit tendency to oscillate, .01 mF capacitor bypasses to ground the negative input pins to prevent it. These capacitors have a minimal effect on the frequency response of the filters.

Figure 2 shows a narrow passband filter, Figure 3, a highpass filter and Figure 4, a low pass filter.

Figure 5 represents two filters (high and low pass) in series.

The program listing in BASIC is for the Microbee computer, however, very little modifications are necessary for other types of computers.

REFERENCES:

Audio Handbook
National Semi Conductors 1977

ar

DEADLINE FOR MAY IS MARCH 21, 1988

QSP

SPECIAL CALL SIGN

The special prefix TP0 will be used for three activity periods in 1988 by the Council of Europe Radio Amateurs Club (CERAC) on the occasion of the 1988 European Campaign for North/South Solidarity.

The dates of the first two operations are as follows:

March 11 to 13, 1988
June 24 to 26, 1988

The date of the third operation is yet to be announced but it is hoped that it will coincide with the visit of His Holiness Pope John Paul II to the Council of Europe headquarters on October 8, 1988, and the call sign will be TP0PAX.

The QSL address is Francis Kremer F6FQK, Station Manager for TP2CE, 31 Rue Louis Pasteur, 67490 Dettwiller, France.

GETTING ON AIR — Part 2

A 80 Metre QRP Transmitter

Peter Parker VK6NNN
C/- Witchcliffe Post Office, WA. 6286

No clicks or chirps.

This simple one valve transmitter can be easily constructed by a beginner and can provide good results. The circuit comes from the *1973 ARRL Handbook* page 169.

Keying is very good with no clicks or chirps. The valve is a 6GV8 and high tension current consumption is about 100 mA.

The capacitor (22 pF) shown in dotted lines to the left of Figure 1, was not included in the original diagram, but was essential with a 6GV8.

Unfortunately, crystals for the CW portion of 80 metres are costly, but luckily a 3.580 MHz crystal is only around $3 from suppliers such as Altronics and Dick Smith Electronics.

Full call operators could possibly modify the transmitter to cover 160, 40, 30 and 20 metres.

This transmitter was built using a piece of plastic with holes cut in it at the appropriate places for the circuit board.

Other amateurs may wish to use tag-strips, matrix board or a PCB.

The capacitors subject to high voltages should be rated at 350 volts or better. The load capacitor can be a pre-set unit if available. High SWR will not damage the 6GV8. RF power output would be about 4-5 watts.

PARTS LIST

QT-Y	DESCRIPTION
1	6GV8 and 9-pin socket to suit
1	3.580 MHz Crystal
1	22 pF Disc Ceramic Capacitor
1	39 pF Disc Ceramic Capacitor
2	10-415 pF Variable Capacitor
1	0.001 uF Disc Ceramic Capacitor
1	0.002 uF Disc Ceramic Capacitor
1	0.005 uF Disc Ceramic Capacitor
2	0.01 uF 350V Capacitor
1	0.47 uF Polyester (Available from DSE)
1	22 ohm Carbon Resistor 0.5W
1	100 ohm Carbon Resistor 0.5W
1	15 kohm Carbon Resistor 0.5W
1	27 kohm Carbon Resistor 0.5W
1	39 kohm Carbon Resistor 0.5W
1	100 ohm 1W with 7-turns of wire wrapped around it
1	1 mH RFC (not critical)
1	2.5 mH RFC (not critical)
	Wire, key, case, nuts, bolts, sockets

ar

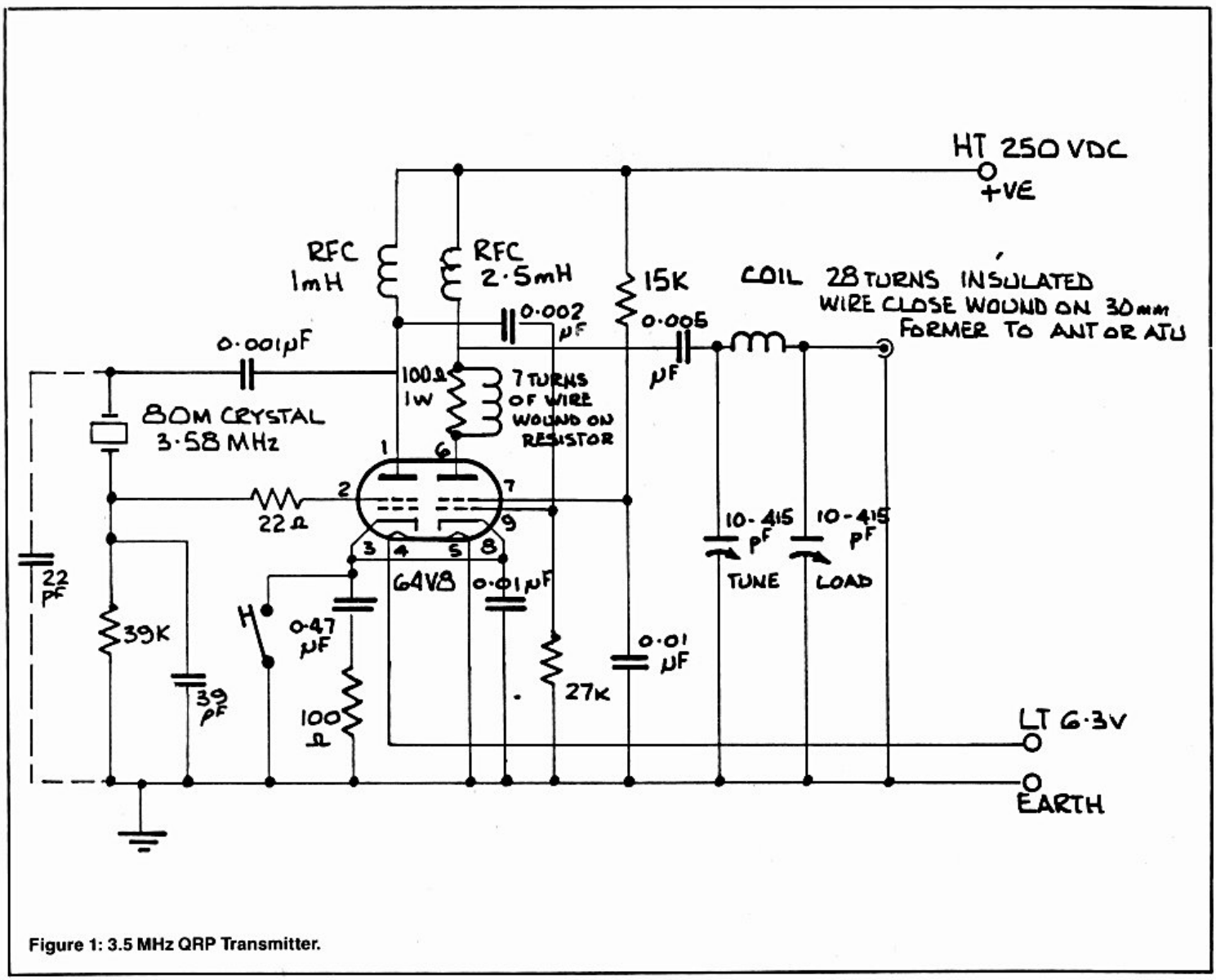


Figure 1: 3.5 MHz QRP Transmitter.

JOTA BY SATELLITE

Peter Hughes VK6HU
NATIONAL CO-ORDINATOR FOR JOTA
58 Preston Street, Como, WA. 6152

Jamboree on the Air (JOTA) in Australia continues to improve. The 1987 results had many reports of increase in quality of activity even though all statistics show an decrease in numbers.

Again this year there were comments of more meaningful contacts lasting up to an hour or more in the improving conditions.

The "quality" highlight if Australian activity was the commercial satellite link between Perth and Sydney.

About six weeks before JOTA, the owners of AUSSAT offered a free channel on 12.500 GHz to be connected to a two metre amateur ground repeater at each end. This had the support of the Wireless Institute of Australia, New South Wales Division and the Repeater Group of the Wireless Institute of Australia, Western Australia Division, but as the concept appeared to be in conflict with DOTC regulation prohibiting linking of terrestrial repeaters, special permission was sought to allow the facility.

As usual the high level of support for JOTA was evident from DOTC and permission was granted. The link would work as a "split" terrestrial repeater.

All concerned should note and acknowledge the consideration which DOTC has given JOTA and the various Jamboree, Venture, Moot and Guide stations has been of great value in putting Australia on the JOTA calendar as one of the world's leading countries over 30 years.

The result was highly successful. Amateurs at both ends were keen to test the facility and, while the Scouts and Guides who were fortunate enough to participate, appreciated the clear contact, it is probably only those leaders versed in the vagaries of recent propagation conditioned who fully understood (and marvelled) at the clean signal between Sydney and Perth. Amateurs involved found it quite intriguing to be able to communicate on a hand-held unit on two metres over a ground distance of nearly 3500 kilometres.

The link was established as shown in Figure 1. Spacecraft A1 is "geophysically stationary" in that it 'appears' to remain in the same position. Actually, it is travelling at about 11 000 km/h to maintain this position some 36 000 kilometres above the equator at Longitude 160 degrees east. It was placed in orbit by ejection from space shuttle *Discovery* on August 28, 1985, and is a spinning cylinder 2.2 metres diameter by 6.6 metres high and weighs 655 kilograms. T13 was the transponder used for this exercise.

Due to differences in transmissions from those previously experienced, there were a couple of interesting points of procedure for the junior (and some senior!) operators to learn — and follow!

Firstly, it is unusual for Scouts and Guides to use repeaters anyway, and those who had done so previously had to learn to wait for two repeater 'tails' (one from each) otherwise the automatic 'time out' devices were being retained to cut off a transmission before it finished. In fact, to avoid the situation where the repeaters would automatically 'access' each other and 'cycle' back and forth, a delay to the receive acknowledgment was built in to the Perth amateur repeater by Will VK6UU.

Secondly, although the speed of electomagnetic signal is not noticeable under regular contact conditions, for this system the 72 000 kilometre journey up and back, coupled with some delay in ground repeaters, became significant creating about one second delay. This provided a classic case for proper education and instruction of the junior operators to avoid the stereo-type "Hello / Hello / How are you? / Good" type of contact. Because of the delay the first "Hello" operator became exasperated with lack of answer so repeated the "Hello" in time to coincide with the "Hello" reply just arriving from the other end! For years JOTA organisers have been trying to eradicate such poor communication procedure and the 'name, rank and serial number' type of contact. This effort has now been amply vindicated.

Apparently the AUSSAT staff were also very keen to find out how the system would operate as they monitored the channel, and even took the trouble to telephone Scout Headquarters in Perth, from Sydney, to make some suggestions for procedure to better facilitate contacts. Their efforts were very much appreciated.

The VK2 Division of the WIA picked up the open address from VK1BP on HF on the Saturday afternoon and fed it into the AUSSAT channel so that all Perth and Sydney metropolitan JOTA stations had a magnificent two metre FM signal to enjoy the proceedings.

Special thanks to all responsible for the link and to all amateurs everywhere who make JOTA possible each year.

ar

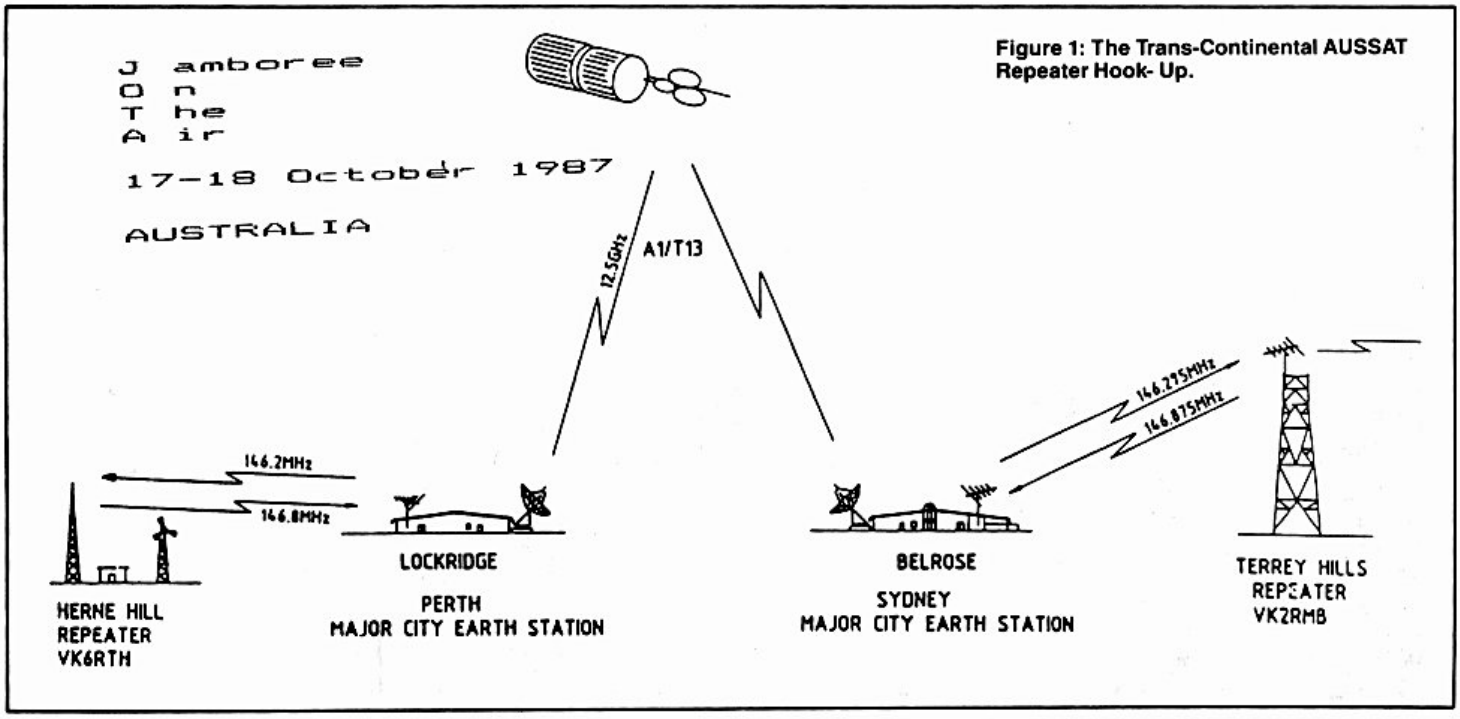


Figure 1: The Trans-Continental AUSSAT Repeater Hook- Up.

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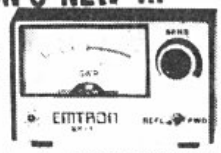

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WIRELESS INSTITUTE OF AUSTRALIA

PAPER 5 — A SYNOPSIS OF MEMBERS COMMENTS

by the Future of Amateur Radio Working Party

The Working Party Membership includes:
Ron Henderson VK1RH
Gordon Bracewell VK3XX
John Aarsse VK4QA
Stephen Phillips VK3JY

BACKGROUND

Prior to preparation, during 1987, of four earlier papers [1] on the Future of Amateur Radio, the Working Party was involved in drafting a background paper [2] for the May 1987 Federal Convention and in compiling the Guidelines to Executive [3], arising from Councillors deliberations at that Convention. Of recent times the Working Party has been required to report to Executive on the surveys conducted by Divisions on the *Novices on Two-Metres* issue [4].

These activities have given rise to some feedback from the membership, consequently this paper is devoted to a synopsis of members comments.

AIMS

To provide a synopsis of members comments related to the Future of Amateur Radio and determine their effects on the conclusions of Future of Amateur Radio Working Party papers published to date.

SOURCE MATERIAL

The source material containing members comments has been arranged into six distinct categories as follows:

a Devolution of amateur examinations,
b Novices on two metres,
c General comments on the future of amateur radio,
d Specific submissions to the Future of Amateur Radio Working Party,
e ARA's second Readers Survey,
f Summary of Divisional surveys — novices on two metres debate.

As these sources are spread out over several years and contain in themselves separate subject oriented surveys, some inconsistencies in nomenclature and even double counting of results is inevitable. Nevertheless, they constitute the largest collection of members' views assembled to date and should not be lightly disregarded.

An earlier survey of WIA members, conducted by means of an *Amateur Radio* questionnaire in December 1984, was also consulted. That survey was directed principally towards members attitudes to AR magazine and none of the findings are applicable to this investigation.

DEVOLUTION OF AMATEUR EXAMINATIONS

In early 1987, when devolution of amateur examinations appeared a very likely action by DOTC, a member of the Working Party conducted a short survey of opinions on the future of amateur radio having an examination theme. The survey was based on letters to the editor of *Amateur Radio* (Over to You! column) and commenced at the May 1986 issue following publication of the first Harrison/Linton paper. Recently, that survey was extended to cover all issues of AR up to and including December 1987.

To facilitate comparisons, the original early 1987 survey aspects have been retained, suitably extended and enhanced to allow other source material to be added. Table 1 shows those aspects in the left column, with further columns devoted to each of the six sources identified above. The examination survey shows support for:

a the Harrison/Linton report,
b a digital class of licence,
c a need to attract youth to amateur radio,
d a desire not to reduce standards,
e marginal support for a VHF/UHF beginner/student licence grade,
f a desire to enhance novice licence privileges,
g a desire to increase promotion of amateur radio,
h concern as to equipment costs and a need for simpler projects, and
i several other lesser commented-upon items.

Whilst no precise record was kept of the number of letters published, an examination of the working tally sheets suggests a letter rate of two to three per month for almost two years.

NOVICES ON TWO METRES

Excluding Divisional surveys which are discussed later, and letters to the editor published in AR and considered earlier, there were a few letters on the subject of novices on two metres directed to the Federal Office. These showed a three to one wish to enhance the existing novice licence conditions with one lone plea to raise qualification levels and make amateur licences an elitist group.

GENERAL COMMENTS ON THE FUTURE OF AMATEUR RADIO

Excluding submissions and responses directed specifically to the Future of Amateur Radio Working Party, (which are reviewed in the next section), a number of letters were sent direct to the Federal Office, usually bypassing Federal Councillors and necessitating photocopying back to Divisions.

These responses, shown in Table 1, indicate:

a support for the Harrison/Linton report,
b a strong desire to enhance novice licence conditions,
c support for a common band,
d a desire to restructure amateur radio,
e a desire not to reduce standards, and
f some support for a VHF/UHF beginner/student licence grade.

SPECIFIC SUBMISSIONS TO THE WORKING PARTY

Despite a request for comments in the Working Party's very first paper; such comments to be channelled through Divisional Federal Councillors (whose names and addresses were given), very few submissions have been received. However, it should be borne in mind the last paper was published as this one is being drafted. As less than 25 percent came via Federal Councillors, this suggests members are generally unaware of the Divisional system of representation operating (?) within the WIA.

As shown in Table 1, the responses indicate:

a a wish not to reduce standards,
b a desire to enhance the novice licence grade,
c support for increased promotion of amateur radio, the need for a common band and a desire for simple projects,
d a wish to restructure the amateur licence system; this response now replaces the earlier support for the Harrison/Linton paper, and
e no support for elimination of CW proficiency, or an advanced class licence, or DOTC assigned digital modes sub-bands.

ARA'S SECOND READERS SURVEY

In the second half of 1986, ARA magazine conducted their second readers survey. The results, which were published in early 1987 [5], relate to almost 500 readers responses and contain several results which align with the items used in Table 1. Whilst not all respondents were WIA members (61 percent) their collective views are relevant. Specifically there was:

a support for the Harrison/Linton paper,
b no support for a VHF/UHF beginner/student licence grade,
c support for restructuring the amateur licence system,
d strong rejection of a proposal to drop CW from licence requirements, and
e equal support for ("added incentive") and rejection of ("deepens divisions") a higher licence class.

SUMMARY OF DIVISIONAL SURVEYS — NOVICES ON TWO METRES

The Working Party, in its report to Executive of October 1987, summarised the results of Divisional surveys on the issue of novices on two metres. The conclusions of that report are shown at Appendix 1 and appeared in AR [4]. The survey population was approximately 24 percent of total WIA membership. This is several times greater than the responses observed for the other sources and is very significant.

Five points from the survey summary align with items of Table 1 and are shown thereon. They are:

a no support for digital data transmission modes for novice licencees,
b no support for a VHF/UHF beginner/student licence grade,
c desire to enhance novice licence conditions,
d near unanimous support for a common band, and
e a desire to restructure the amateur licence system.

Table 1: Overall Comparison of Responses from all Sources.

ASPECT	DEVOLUTION OF AMATEUR EXAMS	NOVICES ON 2m CORRESPONDENCE	GENERAL COMMENTS ON FUTURE OF AMATEUR RADIO	SPECIFIC SUBMISSIONS TO WORKING PARTY	ARA'S SECOND READERS SURVEY (%)	SUMMARY OF DIVISIONAL SURVEYS ON NOVICES ON 2m
Support Harrison/Linton paper	9 for / 3 against		3/1		55/21	
Introduce digital class licence	11/3		1			Two Divisions against
Seek digital sub-bands assigned by DOTC	1		1	1 against		
Need to attract youth	10		1	1		
Reintroduce YRS	3					
Increase promotion of amateur radio	7		1	4		
Do not reduce standards	14		2	3		
Raise qualification levels	3	1	1	1		Two Divisions for
Restructure licence scheme				10	31/18	
Remove CW qualification				1 against	21/74	
Add a higher class of licence				1 against	36/33	
Increase power levels			1	1		
Need simpler run and cheaper examinations			1	1		Three Divisions against
Add a VHF/UHF beginner/student licence	9/6		2	1	20/48	Four Divisions for
Enhance novice licence	10/3	6/2	10/2	7		Seven Divisions for
Need a common band			3	5		
Restructure amateur radio completely			3	3		
Expect a quality magazine	1					
Cost of equipment a problem	4			1		
More construction and simpler projects	5		1	2		
TOTAL OBSERVATIONS/LETTERS/ RESPONSES	101	6	20	16	500	2000+

NOTES:
Composite entries 9/3 indicate 9 "for", 3 "against".
Single entries are "for" unless annotated "against" in the body of the Table.
Novices on 2m Survey numbers: VK1, 39; VK2, 57; VK3, 547; VK4, 1100; VK5, 167; VK6, not reported; VK7, 107.

One further point, viz not a majority support for novices on the whole of the two metre band, is at variance with a conclusion contained in an earlier Working Party paper. This revision will be reflected in the Working Party's final conclusions and recommendations paper.

CONCLUSIONS

The series of papers, produced by the Working Party and published in AR magazine, has provoked little in-depth debate. This could be due to the lead times involved with AR as the last paper has only recently appeared.

The members responses that have been generated have, to a large extent, bypassed Divisions and Federal Councillors suggesting the available channels for communication are either not understood or too cumbersome and time delaying.

The greatest response came from divisional "Novices on Two Metres" surveys, in total about 24 percent of the WIA membership responded by one means or another.

On the whole, there is a widespread desire for licence system restructuring without creating a lower grade than novice or a grade above unrestricted (AOCP). Within these bounds there is strong support for enhancing the novice licence grade and creating a common band for all licence classes.

RECOMMENDATIONS

It is recommended the Working Party's final paper, Paper 6 — Conclusions and Recommendations, to be prepared for adoption by the 1988 Federal Convention, reflect the members' views and comments identified in this paper.

It is further recommended the current series of home construction and simple projects being published in AR magazine be continued to satisfy the expressed demand.

The matter of WIA channels of communication needs examination and perhaps reorganisation if the current membership — division — federal system is confirmed cumbersome and inefficient.

REFERENCES

1 a) The Future of Amateur Radio, AR Sep 87.
b) Frequency Bands and Emissions, AR Nov 87.
c) A Proposal to Restructure Amateur Radio Licencing, AR Dec 87.
d) The Future of Amateur Radio — Options, AR Jan 88.
2 Federal Convention Agenda Item, The Future of Amateur Radio, AR Apr 87.
3 Future of Amateur Radio — Guidelines to Executive, AR Aug 87.
4 Summary "Novices on Two Metres" Surveys Conducted by Divisions. AR Feb 88.
5 Amateur Radio Opinion Poll, Amateur Radio Action, Vol 9 No 10 (Feb 87).

APPENDIX 1

CONCLUSIONS OF SUMMARY OF "NOVICES ON TWO METRES" SURVEYS CONDUCTED BY DIVISIONS

★ There is not a majority of Divisions supporting the 1987 Federal Convention motion.
★ The requirement for a common band is near unanimously supported.
★ Whilst there is not majority support for all of two metres to be the common band, there is majority support for part of that band.
★ There is also majority support for part of the 70 centimetre band, but not for part of the six metre band.
★ There is strong support for restructuring the amateur licence system.
★ There is not support for a licence grade below novice, nor for data modes transmission by novices.
★ The response to Divisional surveys constituted 24 percent of all WIA memberships.

ar

VK2BWI SLOW MORSE PRACTICE SESSIONS VK5AWI

AN URGENT AND ONGOING MESSAGE TO ALL . . .

The frequency of 3.550 MHz is used every evening from 0930 UTC onwards by the *Slow Morse Practice Stations VK2BWI and VK5AWI.*

VK2BWI and VK5AWI are official Institute call signs, used to identify Slow Morse Practice sessions to listeners studying for the Telegraphy sections LP (five words per minute), and NR (10 WPM), of amateur radio examinations.

The use of this frequency at these times by other stations is causing unnecessary, and often thoughtless interference, to students and upgrading amateurs, who are trying their hardest, often under difficult conditions of reception, to copy the Morse practice.

Please. . .do not make their task any more difficult by initiating, or encouraging, contacts on, or near, 3.550 MHz, from 0930 UTC onwards in the evenings.

—Contributed by Ross Wilson VK2BRC

WIA VIDEO TAPE PROGRAM TITLE LISTING

John Ingham VK5KG
FEDERAL VIDEOTAPE CO-ORDINATOR
37 Second Avenue, Sefton Park, SA. 5083

SEE NOTE	TITLE (in chronological order within each subject grouping)	LECTURER	PROD	APPROX TIME in MINS	COL/ B&W	YEAR MADE (19..)	DESCRIPTION & OTHER INFORMATION
GENERAL PROMOTIONAL FILMS							
—	The Ham's Wide World		ARRL	30	Colour	69	*Superseded by "The World of Amateur Radio"*
—	This is Amateur Radio		ARRL	15	Colour	70	*Pitched at Teenagers*
—	Moving up to Amateur Radio		ARRL	15	Colour	75	*Pitched at CBers*
©	7J1RL DX-pedition		JARL	60	Colour	76	*General Amateur Radio Interest: LOAN ONLY*
—	This Week Has Seven Days looks into Amateur Radio		HSV7	25	Colour	78	*Pitched at Teenagers: includes some ARRL footage*
—	Amateur Radio — The National Resource of Every Nation		VK5KG	6	Colour	79	*Encapsulates AR: good for public exhibition*
—	The New World of Amateur Radio		ARRL	30	Colour	82	*Pitched at Adult Level*
HISTORIC INTEREST							
©	Wireless Telegraphy — circa 1910		?	10	B&W	10	*Archive Material courtesy David Wardlaw VK3ADW*
‡©	Amateur Radio (TV Pilot Program		WIA NSW	30	B&W	68	*Archive Material courtesy TEN Channel 10*
—	Opening of Burley Griffen Building — SA HQ		VK5KG	50	Colour	77	*Archive Material*
—	History of ATV in South Australia		VK5KG	30	Colour	80	*Archive Material, still building*
—	ATV in Australia 1978 — made for British ATV Club		VK5KG	30	Colour	78	*Archive Material*
—	ATV in United Kingdom 1978 — reply from BATC		G8CJS	30	Colour	78	*Archive Material*
‡	Port Macquarie Field Day — 1983		VK2BFM	25	Colour	83	*Archive Material*
‡	VK2 75th Anniversary Seminar Keynote Speeches		WIA NSW	135	Colour	83	*Dr David Wardlaw & State Manager DOC*
©	Heard Island DX-peditions		Ch 2,7,9&10	20	Colour	84	*Archive Material: No Loan or Copy Available*
‡	Heard Island DX-pedition	VK2BCC	WIA NSW	60	Colour	86	*Raw Unedited; from 1986 VK2 Seminar*
‡	Opening of Amateur Radio House — NSW HQ	VK2BCC	WIA NSW	102	Colour	83	*Archive Material*
ANTENNAS AND PROPAGATION							
©	G6CJs Aerial Circus	G6CJ	WIA	90	B&W	77	*The Definitive Antenna Lecture: Loan Only*
—	Wire Antennas	VK5RG	VK5KG	40	B&W	78	*Antennas for HF and Antenna Tuners*
—	Loaded Wire Antennas	VK5NN	VK5KG	50	Colour	80	*Using Inductive and Capacity Loaded Antennas*
—	Getting Started in Understanding the Ionosphere	VK5NX	VK5ZBD	50	Colour	83	*How the Ionosphere Aids HF Communication*
‡	VHF Signal Enhancement by Aircraft	VK2ZAB	WIA NSW	70	Colour	86	*Raw Unedited; from 1986 VK2 Seminar*
‡	Antennas and Directivity	Guy Fletcher	OTC	73	Colour	85	*Lecture given to a group of radio amateurs*
‡	Antenna Rotator Systems	VK5AIM	VK5KG	50	Colour	86	*Servicing the several different types*
‡	Broadband Antennas	VK5RG	VK5KG	62	Colour	86	*Includes terminated antennas*
SPACE — GENERAL INTEREST							
—	Apollo 13 Disaster	VK5JM	VK5KG	90	Colour	80	*Australian Tracking Procedure Saved Apollo 13*
—	SSTV Pictures from Space — Voyager		VK5KG	15	Colour	83	*SSTV Pictures Converted from Saturn Fly-Past*
—	AUSSAT — Australia's Domestic Communications Satellite	VK5JM	VK5KG	62	Colour	84	*Technical Description of Services Offered*
‡	Amateur Radios Newest Frontier		ARRL	26	Colour	85	*Amateur Radio in Space; General PR*
‡	Working W5LFL in Orbit from VK1ORR		Richard Elliot	23	Colour	86	*Raw Unedited Actuality Footage*
AMATEUR SATELLITES							
—	Getting Started in Amateur Satellites	VK5HI & VK5AGR	VK5KG	60	Colour	83	*Superseded (see below)*
—	An Introduction to Amateur Satellites (Part 1)	VK5AGR	VK5KG	60	Colour	84	*An Overview of Amateur Satellite Operation*
—	Micro-Computer Aids to Satellite Tracking (Part 2)	VK5AGR	VK5KG	30	Colour	84	*Programs for Tracking and Decoding Telemetry*
—	Using Phase 3 Amateur Satellites	VK5HI	VK5KG	90	Colour	84	*History, Construction and Use of High Orbit Satellites*
—	The AMSAT OSCAR Phase 3 Story	Dr Karl Meinzer DJ4ZC	VK5KG	80	Colour	85	*"The Father of OSCAR" includes film of the Launch*
‡	Antennas for Satellites	Dr Trevor Bird	WIA NSW	75	Colour	86	*Raw Unedited from 1986 VK2 Seminar*
DATA TRANSMISSION							
—	Getting Started in Amateur RTTY	VK5JM	VK5KG	85	Colour	83	*RTTY using Teleprinters and Micro-Computers*
—	Amateur Packet Radio	VK5AGR	VK5KG	60	Colour	84	*Theory and Demonstration*
‡	Packet Radio — 10 months on	VK2KYJ & VK2AAB	WIA NSW	65	Colour	85	*Raw Unedited from 1986 75th Anniversary VK2 Seminar*
‡	X.25 Protocols and Packet Switching	Barry News	OTC	47	Colour	86	*Lecture given to a group of radio amateurs*
AMATEUR COMPUTERS							
—	Demonstration of VK5RTVs Micro-Computer Controller # 1	VK5KG	VK5KG	10	Colour	79	*First Micro-Computer Controlled Repeater in Australia*
—	Understanding Micro-Processors	VK5PE	VK5KG	60	Colour	80	*A Somewhat Dated Technical Description*
—	An ATV Ham-Shack Micro-Computer	VK3AHJ	VK3AHJ	10	Colour	81	*Describes now unavailable Micro-Computer Kit*
—	Getting Started in Amateur Micro-Computers	VK5IF	VK5KG	33	Colour	83	*Demonstration of Hard and Software for Amateur Radio*
AMATEUR TELEVISION: Technical							
—	The Signal to Noise Story	VK3ATY	VK3AHJ	45	Colour	82	*Superseded by "UHF Pre-Amplifiers" (see below)*
—	UHF Pre-Amplifiers	VK3ATY	VK3AHJ	45	Colour	83	*Explanation and Demonstration of Low Noise Pre-Amplifiers*
—	Getting Started in Amateur Television	VK5KTV	VK5KG	55	Colour	83	*How to Set-Up an Amateur Television Station*
—	Testing Amateur Television Transmitters	VK5KG	VK5KG	50	Colour	83	*How to Correctly Measure Amateur Television Systems*
*	High Definition Television Tutorial	Don Fink	WB2LLB	60	B&W	83	*A Look at What is to Come in Broadcast Television*
*	ATV Hamfest, York Pennsylvania, September 1983	Various	WB2LLB	360	Colour	83	*Various ATV Technical Lectures from USA*
AMATEUR TELEVISION: Activity							
—	ATV in Australia 1980/81 — Made for British ATV Club		VK5KG	60	Colour	80	*Clips from ATV Groups in VKs 2, 3, 4, 5, and 7*
—	ATV in United Kingdom 1978/81		G8CJS	30	Colour	81	*Re-make of their Previous Effort*
*	CQ ATV DX International 1983		WB2LLB	60	Colour	83	*ATV in USA and Europe*
	ATV in Victoria, 1984		VK3AHJ	54	Colour	84	*Courtesy of "The Roadshow Gang"*
AMATEUR TELEVISION: General Interest							
—	Low Definition Television	Chris Long	VK5KG	25	Colour	82	*Re-Creation of Television as Transmitted by Baird*
*	Overseas Television Clips about Amateur Television, etc		WB2LLB	60	Colour	83	*Broadcast Television Clips from USA and Europe*
—	Model Aero-Nautical Mobile ATV	VK5GO	VK5KG	6	Colour	83	*Amateur Television Camera and Transmitter Mounted in a Model Aeroplane*
‡	VK5RCN — Australia's First Wind Powered ATV Repeater	VK5KAU	VK5KG	61	Colour	86	*A Tour In and Around VK5RCN*

MISCELLANEOUS

—	**An Auxiliary Battery Charger**	VK5NX	VK5KG	30	Colour	**81** *Charging a Second Mobile Battery*
—	**Lecture — Winning Fox-Hunts**	VK5TV	VK5KG	45	Colour	**81** *How to do it from one who has!*
—	**Getting Started in Amateur Construction**	VK5AIM	VK5KG	50	Colour	**83** *Mechanical Hints for Novice Constructors*
—	**Communication Consequences of Nuclear War**	Dr John Coulter	VK5ZBD	60	Colour	**83** *Why Your Gear May Not Survive, Even If You Do*
—	**The Far Eastern Broadcasting Company**		VK5KG	60	Colour	**84** *How a Shortwave Broadcaster Operates*
—	**The Australian "Over the Horizon Radar"**	Dr Paul Whitham	VK5KG	60	Colour	**84** *How the "Australian Woodpecker" Works*
—	**What to Expect When the Radio Inspector Calls**	Geof Carter DOC	VK5KG	34	Colour	**84** *Geof is a Department of Communications Field Officer*
‡	**Doppler Direction Finding for Fox-hunters**	VK2BYY	WIA NSW	43	Colour	**85** *Raw Unedited from 75th Anniversary VK2 Seminar*
‡	**Fitting BNC Connectors**		OTC	7	Colour	**85** *Correct Assembly of Crimp Type BNC Plugs*
‡	**Handling Static Sensitive PCBs**	Paul Targent	OTC	6	Colour	**86** *Improving Reliability of Printed Circuits*
‡	**Extra License Grades**	VK2ZTB	WIA NSW	70	Colour	**86** *Raw Unedited; from 1986 VK2 Seminar*

NOTE:
© denotes Copyright: no copy service
‡ denotes New Addition
** denotes Optically Converted to PAL from NTSC by WB2LLB — noticeable flicker*
Standard Formats: Beta; Video 8 St & L Play; Dolby and Hi-Fi sound — please specify when ordering

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Now every radio club can provide their members with quality technical lectures on subjects covering the whole range of amateur radio activities by taking advantage of the WIA Federal Videotape Library. You will find this a boon, particularly if yours is a country club which often has difficulty obtaining a variety of expert lecturers for regular meetings.

Individual amateurs and librarians should take note of the new Duplication Fees at the end of this article.

For radio clubs affiliated with the WIA, it is inexpensive and easy. Here is how it works:

Except for those titles for which the WIA does not hold a copyright licence, all you have to do is . . .
Supply the Videotape Co-ordinator with a video-cassette of an available format
Enclose another stamped, return-addressed padded mailbag and the program is free for you to use in support of amateur radio in your area . . . including copying and transmission over the air if you wish

Those programs which are copyright are available only on loan. To obtain any of them send with your request . . .

Information about your preferred VCR format

A statement signed by a responsible officer of your club that "I undertake that while (Program Title) is assigned to me, I will not allow it to be transmitted over the air, nor copied by any means whatsoever, and that I will return the same promptly after showing".

A stamped addressed padded mailbag suitable for cassettes of your preferred format.

The present available formats are . . .
U-MATIC — size 260 x 173 x 40mm, mass 900 grams (to institutions only). Standard play — one hour maximum only. Standard sound only on channel 2 (No Dolby).
VHS — size 200 x 110 x 30mm, mass 350 grams. *Standard play four hours maximum, or long play eight hours maximum as requested. * Standard Sound — Dolby On or Off as requested. Hi-Fi FM Sound also present on all VHS cassettes.
BETA — size 160 x 100 30mm, mass 300 grams. Standard play three and a quarter hours maximum only. Standard sound only (No Dolby).
VIDEO 8 — size 103 x 68 x 20mm, mass 80 grams. *Standard play one and a half hours maximum, or long play three hours maximum as requested. Hi-Fi FM sound is standard (No Dolby).

Obviously, the smaller and lighter the cassette, the less postage.

* NOTE: Be sure to request Standard or Long Play, Dolby On or Off.

NOTE TO INDIVIDUAL AMATEURS

Since the inception of the WIA Federal Video Service, cassettes have been made freely available to all comers, especially isolated amateurs. However, recently there has been a rapid rise in the number of requests from individual amateurs, some asking for over 10 hours of programs at one time.

Video duplication is a real-time, one-at-a-time operation for which the costs of maintenance of the equipment is not small. Obviously, the Service is much more economical if, say, one tape is seen by 30 members of a club than if each of the 30 members were to request their own personal copy. If every member of the WIA requested just one program, it would take about four years at 40 hours a week to service!

So, in an effort to encourage requests from groups of amateurs rather than individuals, from now-on a Duplication Fee of $2 per hour, or part thereof, will be payable in advance for all requests from individuals. All such fees will go towards upkeep of the duplication equipment.

NOTE TO LIBRARIANS

A number of educational institutions have already availed themselves of the technical lecture tapes from the WIA. While this service will continue to be available, from now-on a Duplication Fee of $10 per hour, or part thereof, will be payable in advance by all institutions not affiliated with the WIA. All such fees will go towards the production costs of future Technical Lectures.

NOTE RE TAPE CASSETTE QUALITY

The WIA Videotape Co-ordinator retains the right to refuse to copy onto inferior quality video tape. In the past such tape has caused many hours of wasted time through clogged video heads, and in future only reputable brands of video tape will be accepted.

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75TH ANNIVERSARY YEAR OF THE RSGB

The Radio Society of Great Britain extends a warm welcome to readers to join in their special celebrations to mark their 75th Anniversary.

The main event will be a three-day Convention at the National Exhibition Centre near Birmingham on July 15/16/17, 1988. It is hoped that his Royal Highness, the Prince Philip, the Society's Patron, will be able to attend to open this Convention.

Anyone who would like to attend should write to The Secretary, RSGB Headquarters, Lambda House, Cranborne Road, Potters Bar, Hertfordshire, EN6 3JE, who will provide a special information pack giving details of accommodation, UK travel, and special 75th Anniversary call signs for overseas visitors. (Note: these must be applied for in advance via RSGB).

Provisional Program of Events — July 1988
July 15/16/17 — RSGB National Convention, National Exhibition Centre, near Birmingham.
July 19/20/21 — RSGB Headquarters at Potters Bar open to visitors between 10 am and 4 pm.
July 22/23 — Data Convention at the famous Harrow School near London (Packet Radio/RTTY/AMTOR).
July 28 — International Satellite Meeting hosted by RSGB near Guildford, Surrey.
July 29/30/31 — AMSAT UK Satellite Colloquium at the University of Surrey, Guildford (Information from G3AAJ, QTHR).

—Information supplied by Steve Pall VK2PS

The famous inventor Marconi demonstrating radio to the armed services and government officials on Sailsbury Plain, England on September 2, 1896. Marconi was subsequently a member of the Radio Society of Great Britain.

—From an original painting by Stephen Spurrier ARA

VHF UHF — an expanding world

Eric Jamieson VK5LP
8 West Terrace, Meningie, SA. 5264

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.005	H44HIR	*Honiara*
50.005	ZS2SIX	*South Africa*
50.010	JA2IGY	*Mie*
50.022	ZS6PW	*Pretoria*
50.050	ZS6DN	*South Africa*
50.075	VS6SIX	*Hong Kong*
50.075	ZS4SA	*South Africa*
51.020	ZL1UHF	*Auckland* [1]
52.013	P29BPL	*Port Moresby*
52.100	ZK2SIX	*Niue*
52.200	VK8VF	*Darwin*
52.250	ZL2VHM	*Manawatu*
52.320	VK6RTT	*Wickham*
52.325	VK2RHV	*Newcastle*
52.330	VK3RGG	*Geelong*
52.345	VK4ABP	*Longreach*
52.350	VK6RTU	*Kalgoorlie*
52.370	VK7RST	*Hobart*
52.418	VK0MA	*Mawson*
52.420	VK2RSY	*Sydney*
52.425	VK2RGB	*Gunnedah*
52.435	VK3RMV	*Hamilton*
52.440	VK4RTL	*Townsville*
52.445	VK4RIK	*Cairns*
52.450	VK5VF	*Mount Lofty*
52.460	VK6RPH	*Perth*
52.465	VK6RTW	*Albany*
52.470	VK7RNT	*Launceston*
52.485	VK8RAS	*Alice Springs*
52.510	ZL2MHF	*Mount Climie* [2]
144.022	VK6RBS	*Busselton*
144.400	VK4RTT	*Mount Mowbullan*
144.410	VK1RCC	*Canberra*
144.420	VK2RSY	*Sydney*
144.430	VK3RTG	*Glen Waverley*
144.445	VK4RIK	*Cairns*
144.445	VK4RTL	*Townsville*
144.465	VK6RTW	*Albany*
144.470	VK7RMC	*Launceston*
144.480	VK8VF	*Darwin*
144.485	VK8RAS	*Alice Springs*
144.550	VK5RSE	*Mount Gambier*
144.565	VK6RPB	*Port Hedland*
144.600	VK6RTT	*Wickham*
144.800	VK5VF	*Mount Lofty*
144.950	VK2RCW	*Sydney*
144.950	VK3RCW	*Melbourne*
145.000	VK6RPH	*Perth*
432.066	VK6RBS	*Busselton*
432.160	VK6RPR	*Nedlands*
432.410	VK1RBC	*Canberra*
432.420	VK2RSY	*Sydney*
432.440	VK4RBB	*Brisbane*
432.445	VK4RIK	*Cairns*
432.445	VK4RTL	*Townsville*
432.450	VK3RAI	*MacLeod*
432.535	VK3RMB	*Mount Buninyong*
432.540	VK4RAR	*Rockhampton*
1296.198	VK6RBS	*Busselton*
1296.420	VK2RSY	*Sydney*
1296.445	VK4RIK	*Cairns*
1296.480	VK6RPR	*Nedlands*
10300.000	VK6RVF	*Roleystone*
10445.000	VK4RIK	*Cairns*

1 The Auckland beacon ZL1UHF on 51.010 MHz has been included on the list as it has been heard in many places around Australia. The Hornby beacon on 52.310 MHz seems to be in doubt so it has been removed and ZL2MHF on Mount Climie listed in its place. This comes under notation (2).

2 Col VK5RO, as the result of contacts into South Africa on the HF bands, has come up with a list of active beacons in that area. They are included in the 50 MHz area so you may make a note of them, as I do not propose listing them all the time. (Incidentally, Col said active six metre operators in South Africa included ZS6WB, ZS6OB, ZS6LN, ZS5AV, ZS2BE, ZS2FM, ZS1LA, ZS2DA and ZS6HS).

Col made no mention of the earlier statement that the six metre beacon on 50.022 MHz was no longer transmitting to Australia due to TVI at their end and will try and ascertain what the exact position is in regard to operation.

THE BEACON SITUATION

As the result of much prodding, the Australian Beacon List is approaching a very high degree of accuracy regarding operational beacons. Those who have not sent in any information are VK8VF in Darwin, VK2RGB Gunnedah, VK3RTG Glen Waverley, VK6RPB Port Hedland, VK3RAI MacLeod, VK3RMB Mount Bunninyong, VK6RVF Roleystone. VK4ABP, in Longreach, also has not replied but the beacon has been consistently heard in VK5 for some time now so it is safe to list it as operational.

With the degree of activity on 144 and 432 MHz in the Melbourne area, it should surely be possible for someone there to let me have the status of their beacons in writing. In the meantime, when the next good tropo opening occurs across to Melbourne from my now rather good location at Meningie, I could be in a position to hear the Melbourne beacons on those bands. But it seems rather a different position when one looks at VK8VF as the Darwin path has been very poor for some years.

There is a need for my listing to be accurate as it is used by many organisations, both in Australia and overseas. I note the WIA Beacon Data Base list in the January issue of AR, includes a number of beacons I have never heard of; eg, 52.300 VK2RBH Broken Hill, 144.535 VK3RGI Gippsland, 576.753 VK6RPB South Hedland, 1296.695 VK6RPB South Hedland, 2304.420 VK2RSY Sydney. Some of these could be the result of applications to construct so may eventually become operational. If anyone has firm information regarding any of the above, I would appreciate a note please.

SPORADIC E SEASON

My closing comment last month was that at Meningie, at least, from December 21 to 23, there had been virtually no six metre activity. That subsequently proved to be a real understatement!

With the advent of one or more large solar flares around 19/12, so many holes were punched in the ionosphere that six metres collapsed and stayed collapsed right throughout the Christmas and New Year period. In fact, at the time of writing, 8/1, there has still been no real recovery. In my 27 years of six metre operating I have never known a year to be wiped out for so long. Something on a smaller scale took place around 1968 but nothing like the present situation. I received a number of phone calls from interstate operators asking if the poor conditions they were experiencing was common to other areas — they had to be told — yes!

It is unfortunate such a situation has arisen as we have not been thus able to adequately compare the two metre scene with the two previous glamour years! The 1987 season was shaping up to being another bumper one judging by the two metre Es contacts being made prior to the flare. Cases like David VK3AUU, working VK2 to VK8 inclusive in less than 24 hours, and trying valiantly to catch a VK1 he could hear to make it all States in that time. There were plenty of instances of five States being worked in the one day, even VK5LP struggling back on the air managed to work four States in one day! But all this quickly finished when six metres collapsed and so two metre Es became non-existent.

Fortunately, there have been some good tropospheric openings, particularly from VK5 to VK3 on 144 and 432 MHz as well as VK5 to VK6 at Albany. VK5NC at Mount Gambier contacted VK7JG on 25/12 on 144. David VK3AUU, has been very consistent with good signals as also has Les VK3ZBJ. Scattered amongst a variety of contacts have been some to Wally VK6WG, at Albany.

On 5/1/88, at 2342, VK5RO heard VK7JG on two metres but did not quite make a contact. Mick VK5ZDR, achieved a contact with Joe, as also did Roger VK5NY. Col VK5RO, also informed me that conditions were such at the time that Reg VK5QR, in Adelaide was able to contact Wally VK6WG, in Albany, on 3.3 GHz! Good going chaps. I have no other details but may be able to find out something for the next issue.

With the collapse of the Es there is little need for me to produce a map again this year showing the extent of two metre Es contacts. Suffice to say however, there is ample evidence such contacts were wide spread before the collapse and that all the Australian States were sharing in those contacts, as well as New Zealand.

I guess I was unfortunate for the Ross Hull Contest which this year, for the first time was using Locator Squares as part of the scoring procedure that such a collapse occurred as there will be very low scoring logs entered. Had I not been able to share in some of those tropo contacts, I would find my only six metre contact to Joe VK4JH on 24/12 decidedly lonely on the log sheet!

The West Australian VHF Group Bulletin tell a little of the story as it affected their end. Good two metre openings started on 4/12 (with six open, of course), at 0311 Peter VK6KXW and Tony VK6ATF established contact on six with P29PL, in Port Moresby who was running seven and a half watts. About six hours later VK6KXW heard Dave VK6YA, in Wickham (north-west Western Australia), working a gaggle of VK8s in Alice Springs and at 0934 he made contact with Mike VK8ZMA, and then VK8ZLX. Soon after, VK8ZMA heard the Perth Channel 2 television signal and VK8ZLX heard the Perth 96 FM broadcast station on his scanner.

At 1010, VK8ZLX heard VK6KXW's keyer and voice on 144.120 MHz. Each heard the other calling at times but propagation would not support a successful two-way contact. VK6KXW was running 100 watts into a DL6WU 11 element beam while VK8ZLX was using 25 watts into a stacked two by 12 element NBS Yagi.

THE HIGHER BANDS

144 and 432 MHz continues to provide excellent contacts across the southern part of the continent. On 8/1 around 0900 VK3UM and VK3NM from Melbourne were good copy as also was VK3AUU at Drouin, east of Melbourne. Several repeaters were available with Channel 1 at Naracoorte being accessible almost anytime from Meningie. A 5 x 9 contact between VK5LP and VK5CMV, on SSB at Naracoorte, resulted from the original repeater contact. Conditions continued good into Melbourne during the morning of 9/1. Later in the day VK5LP had a strange combination contact with Garry VK5ZK, at Goolwa, across the lake from Meningie. The distance of 55 kilometres was covered on Channel 50 FM by Eric and Garry came on 3.600 MHz! Not having an HF antenna at

the moment Eric coupled up the television antenna to the FT101B which was good enough to provide an S5 signal from Garry!

From 0900 the same evening Melbourne stations were again available mostly on 144 MHz. Trevor VK5NC, at Mount Gambier, was S9 on both 144 and 432 MHz, whilst Roy VK3AOS, was S9 on both bands. Roy lives 55 kilometres south of Horsham and has been a regular on the bands for many years. On the UTC morning of 9/1, whilst in contact with Roy again, VK5LP was called by a new call station with a very strong signal, VK3NA. This turned out to be Ray VK3ATN, who has both calls. Ray was extremely strong and is slowly getting back on the air after the upset of having his antenna factory destroyed by fire. The Hamilton beacon on 52.435 MHz continues to be audible every day and is a very good indicator of enhanced conditions. The hardest beacons to hear are in Melbourne.

Trevor VK5NC, reports excellent signals to Melbourne and Adelaide on the morning of Sunday 10/1. VK3BBB and VK3ZJC were mounting an expedition to some high spots not too far from Melbourne for the last day of the Ross Hull Contest, and from Mount Tassie there signals were good to VK5NC. Later they decided to shift to Wilson's Promontory and during the process Brian VK3BBB had problems with the differential of his vehicle and was unable to continue. However, VK3ZJC set up a station there and had a fair signal to VK5NC.

Late on Sunday night excellent conditions in the Adelaide direction again prevailed, with VK5VF, the Adelaide beacon on 144.800 MHz extremely strong. John VK5AEP, at Port Lincoln, was again able to work through the Mount Gambier repeater. Trevor was able to contact VK5s ZDR, RO, NY in the Adelaide area, and also VK5OH at Smokey Bay a long way west on the upper coastal regions of Eyre Peninsula. These enhanced signals continued through to Monday morning when more Adelaide and Melbourne contacts were made.

VK5LP has run into some problems with the overloading of a masthead amplifier on the Elderly Citizens Homes near the Meningie QTH on both 144 and 432 MHz so has decided to be prudent and restrict activities while the problems are sorted out, especially when relations are so cordial as they are at present. The main problem is simply that when I beam to the south-east, my main area of interest, I look right down the throat of the antenna at the Homes which points to Adelaide at north-west!

VK5RO reports the good conditions on 144 and 432 MHz have continued throughout the week ending 15/1. As Col says, this is a typical summer time situation and quite often shows a further improvement around the end of January through to mid-February.

Steve VK5AIM, says he wants to officially complain about the lack of Es this summer! But whom to complain is the problem. He has only eight QSOs between Christmas and New Year!

GENERAL NEWS

A few snippets of information from *Practical Wireless*, November 1987, courtesy Steve VK5AIM. One concerns the introduction of a certificate in the UK for the top scoring station using only a single antenna. One comment was "Not every group using one Yagi did so from choice, G4NYN/P intended using two 19 element Yagis, but on erection the structure collapsed — they salvaged enough elements to make one Yagi!"

Another piece concerns QRP operation. There seems an increased interest in portable operation using low power, many stations have been operating their hand-helds fed into a reasonable antenna with good results. Others have taken out their transceivers and used them barefoot for about 10 watts. Steve asks whether such a contest or field day might be considered in Australia. Any thoughts? Incidentally, some of the UK stations operating in the QRP contests have been using powers as low as five milliwatts, being lower power than the local oscillator in many receivers! G4AGQ tried some experiments, and four contacts were made using 250 microwatts, including one of over 60 kilometres, which is equivalent to 150 000 miles per watt! There used to be an award for 1000 miles per watt!

A letter from Joe VK7JG, says he has upgraded his antenna set up, with a pair of 48 element Jaybeams on 432 MHz while on two metres there are four 20 feet long quad driven Yagis to be erected in the new year and as he said "a new large rotator under the Christmas tree!" On 1296 there is a 10 watt base station and a pair of 28 element loop Yagis. A new tilt over tower is under construction. Everything will be in place around Easter so schedules can be maintained.

Will be pleased to hear some results from you Joe.

CLOSURE

I hope March and April will see the start of some transequatorial propagation or signals across the Pacific as we slowly rise out of the low part of the sun cycle. Keep an ear on six metres around the equinoxial periods in particular and don't overlook using 10 metres as an indicator of a rising MUF.

Thoughts for the month: Woman to friend: "I'm of English descent. My husband's half Scotch and half soda!" and "When a man points a finger at someone else, he should remember that three of his fingers are pointing at himself!"

73. The Voice by the Lake

ar

OLD EXAMINATION PAPERS

The following papers are published courtesy of DOC. They are some of a series of yester-year papers which are published so readers may test themselves. Would the OTs still be able to pass with flying colours? How would the newcomers go with this type of exam?

COMMONWEALTH OF AUSTRALIA
POSTMASTER-GENERAL'S DEPARTMENT
AMATEUR OPERATOR'S CERTIFICATES OF PROFICIENCY

SECTION M (ii) Regulations — **Time allowed — 30 minutes**

NOTE — Three questions only to be attempted.

1 (a) What precautions should be observed by experimental licensees in regard to interference?
(b) Should you be aware that your transmissions were causing interference to the reception of broadcast programmes, what action would you take?

2 What provision should be made by experimental licensees to enable power measurements to be readily obtained.

3 Give, by example, the procedure to be followed when a station hears his own call sign but is unable to read the call sign of the calling station.

4 For what period and at what intervals is one station allowed to call another station?

5 (a) Explain how the Distress Call is signalled — (i) telegraphically, and (ii) telephonically.
(b) In the event of the Distress Call being heard, what action would you take?

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COMMONWEALTH OF AUSTRALIA
POSTMASTER-GENERAL'S DEPARTMENT
AMATEUR OPERATORS' CERTIFICATES OF PROFICIENCY

SECTION K (Regulations) — **OCTOBER 1963**

Time allowed — 30 minutes

NOTE — Three questions only to be attempted. Credit will not be given for more than three answers. All questions carry equal marks.

1 (a) What restrictions are placed on the temporary operation of an amateur wireless station as a portable or mobile unit?
(b) What frequency measuring apparatus must be maintained by the licensee of an amateur station?

2 State regulation requirements concerning:
(a) restrictions imposed on the transmission of an unmodulated carrier wave from an amateur station; and
(b) the documents which must be available for inspection at an amateur wireless station.

3 (a) What precautions should be taken by the operator of an amateur station before he commences to transmit?
(b) During a period of working with another station or stations, what procedure must be adopted concerning announcement of call signs?

4 Give the "Q" code signals for the following —
(a) Send each word or group twice.
(b) Stop sending.
(c) Who is calling me?
(d) Shall I send a series of Vs?
(e) Your frequency varies.

ar

Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW. 2868

ALARA CONTEST RESULTS

This year saw the finalisation of the Five-Year Trophy, the winner being Kim VK3CYL, with an aggregate score of 4382 points. Kim has been presented with the Trophy (a gold cup, suitably inscribed), and we would all like to congratulate her on an outstanding achievement.

The Florence McKenzie Trophy has been awarded this year to Liz VK3PSG, who scored 212 points on CW. Congratulations to Liz on her very proficient use of the key.

WARO members photographed at the ALARA-meet.
From left: Joy VK2EBX, Joan VK3NLO, Poppy VK6YF, Maria VK5BNT, Vicki ZL1OC, Muriel May, Margaret VK3DML, Jenny VK5ANW.

SEVENTH ALARA CONTEST — November 1987

Name & Call	Points	Comments — Certificates
1. Kim VK3CYL	881	Top score overall. VK3 ALARA member Cert. Five Year Trophy.
2. Jan VK3HD	678	
3. Liz VK3PSG	521	Top VK YL Novice. Florence McKenzie Trophy.
4. Joy VK2EBX	396	VK2 ALARA Member Cert
5. Bev VK6DE	357	VK6 ALARA Member Cert
6. Gwen VK3DYL	354	
7. Vlada VK3DVT	257	
8. Marilyn VK3DMS	230	
9. Elva ZL1BIZ	224	ZL ALARA Member Cert
10. Val VK4VR	217	VK4 ALARA Member Cert
11. Celia ZL1ALK	176	
12. Helene VK7HD	173	VK7 ALARA Member Cert
13. Alan VK8AV	169	VK OM Cert
14. Josie VK4VG	164	
15. Diana G4EZI	152	G ALARA Member Cert
16. Les VK3XF	135	
17. Poppy VK6YF	134	
18. Elizabeth VE7YL	117	VE ALARA Member Cert
19. Lindsay VK5GZ	110	
20. Darleen WD5FQX	104	US ALARA Member Cert
21. Margaret VK4AOE	86	
22. Jim VK2AKE	65	
23. Bron VK3DYF	55	
24. Mimi ZS5YO	38	ZS ALARA Member Cert
25. Jock VK1LF	35	
26. Richard G4DZI	34	G OM Cert
27. Kari OF3GD	17	Europe OM Cert
28. Len VK3ALD	15	
29. Mavis VK3KS		Check Log
30. Ivor VK3XB		Check Log
31. Denise VK5YL		Check Log
32. Marlene VK3JAW		Check Log

Scores generally were well down on 1986, with 19 fewer logs being received. Of the 32 logs, 23 were from ALARA members, and nine from OMs.

Considering the poor conditions on the day of the contest, this is a satisfactory result.

Congratulations to all certificate winners, and our thanks to all participants for their interest and support.

The Contest Manager was Marlene VK3JAW (ex-VK2KFQ).

BICENTENNIAL TROPHY

An ALARA life member offers a trophy to the YL or OM who contacts the greatest number of ALARA members, on HF bands only, during the Bicentennial Year 1988.

A complete extract of log, certified as true and correct by two other amateurs, will be required. The certification must read as follows:

"We, the undersigned, hereby certify that the above extract is a true and correct copy of the log of . . . . . .

Signed: . . . . . .

Signed: . . . . . .

The log extract must also be signed by the operator who submits it. In the event of a tie, the Trophy will be awarded to the entrant who gains his/her total in the shortest time.

Contacts on the official ALARA Net do not count.

Logs must be forwarded to reach the ALARA Awards Custodian, Mavis Stafford VK3KS, 16 Byron Street, Box Hill South, Vic. 3128, by January 31, 1989.

BICENTENNIAL STICKERS

During 1988, Australia's Bicentennial Year, special commemorative stickers will be attached to each ALARA Award issued.

Anyone applying for an endorsement of their award (10 additional members) will also receive a commemorative sticker.

These attractive stickers have been designed by Valda VK3DVT.

SILENT KEY

Our sympathy is extended to the family of Eleanor VK4BEM, who became a silent key on December 31, 1987.

BITS AND PIECES

Everyone on the 220 YL Net was pleasantly surprised on December 28, when Zdena OK2BBI, called in from the QTH of Barry VK7GE. Zdena was visiting her brother in Tasmania.

Mary KB6CLL, was involved in a motor accident on Christmas Day. We hope she is now fully recovered.

ALARA received a lovely Christmas Card from Eeva OH3ST, our only member in Finland.

Congratulations to Bobbie VK6MH, a licensed amateur for 50 years.

Maria VK5BMT, has been appointed ALARA-meet Co-ordinator, and if her organisation of last year's ALARA-meet is anything to go by, we can expect great things of the next one in 1990.

NEW MEMBERS

A warm welcome to the following new members: Janet VK6PJL, Ree VK2CAK, Kay Bennetts, Heather ZL1BBT, and Jean GW0ARP.

That's it for this month.

73/33, Joy VK2EBX

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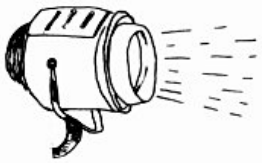
Some of the OMs who attended the ALARA-meet in South Australia, September 1987. From left (Back): George VK3AGM, Geoffrey VK5TY, David VK5OV, Les VK6EB, Dale Baker, Geoff VK3ACZ.
(Centre): Neil VK3KNM, Treva VK5ZIS, Dan Collis, Graeme VK3AGS.
(Front): Bill VK5AWM, Doug VK5PDT, Colin ZL1CS, Ervon Schwerin.

DEADLINE FOR MAY IS MARCH 21, 1988



Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West Launceston, Tas. 7250

I am writing this in mid-January, in the heat and humidity, but as you are reading this now, the weather is cooler and the Equinox is upon you. This is a time when there are many changes made to frequencies by HF users, to take account of the propagational fluctuations. The M-88 period commences on Sunday, March 6, at 0100 UTC, but further alterations will be made on March 27, when Europe and the USSR commence Summer Time. This is a week after Australia reverts to Standard Time.

Broadcasts directed to European audiences will be heard one hour earlier from March 27, whilst other target areas will remain largely unaffected. Although I did notice that international stations, broadcasting in Chinese, also altered the timing of their programs, to allow for daylight saving within the PRC. I don't believe I have the actual date when the Chinese change-over occurs, but I think it is usually early in April. Incidentally, North America begins Daylight Saving on April 24.

It is interesting to note the improvement in HF reception conditions at this location, yet, with the improvement comes the prospect of increased ionospheric disturbances, particularly on high latitude circuits. It has been interesting on 15 metres, especially during the early evening hours. Signals from Europe and the Middle East come in well with broadcasts targeted to these areas. There is almost no activity on the 11 metre broadcasting allocation (25.600 to 26.100 MHz) yet I expect that this should slowly pick-up as the number of sunspots increase.

UPDATES ON DX PROGRAMS

Radio Australia has changed the title of their DX program from "Talkback" to "Communicator". There has been alteration to some releases, but the pleasing news is that the weekly program has been increased in time from 15 minutes to 27 minutes. The release times are 0230, 0730, 1230, 1630 and 2030 UTC. Incidentally, the 1630 release will be transmitted on ABC Radio National, when they relay RA between midnight and dawn locally. "Communicator" is only heard on Sundays!

The VOA has also changed the time-slot for their communications magazine from an insert in the Tuesday evening magazine show to a Saturday evening release. It lasts for 20 minutes, although I have a feeling that it may be a monthly program.

Radio KTWRon Agana, Guam, has a weekly DX program on Fridays at 0945 UTC, 11.805 MHz, directed to Australia. It often has segments from Australian DX clubs.

Listening on the marine allocations over the holiday period has been very rewarding and sometimes exciting. Listening on 2.182, 2.524, 4.125 and 4.485 MHz was interesting with competing yachts in the Sydney to Hobart and Melbourne to Hobart races reporting in on these channels, as well as routine maritime traffic. At the time I am writing this the Bicentennial Tall Ships Race from Hobart to Sydney can be heard. All of this radio activity must have given the OTC operators at the various coast Commstats quite a headache!

At long last I received the D-87 issue of the International Listing Guide just around Christmas time. They have has a few publication problems but should have them ironed out by now. I am also ordering their manual *International Broadcasting Handbook 1988*, so I can compare it with its competitor *World Radio TV Handbook*.

Well, that ends my contribution for this month. Until next time, the very best of DXing and 73!
—Robin VK7RH.

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Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
PO Box 883, Frankston, Vic. 3199

Over these few weeks of so-called holidays I have had cause to consider some philosophical points arising from three separate events.

Firstly, my son made moves towards sorting and reducing the accumulation of parts and equipment which had been collected as of potential value, or put aside for minor or major repairs at some time.

Secondly, I had some dealing with the Taxation Department.

Thirdly, I found a shop which sells the round wall plaques which are labelled *This is a Round Tuit* for those (like me) who have a long list of things they will do when they get "Around Tuit."

I began to wonder about how we set our valuations on the things we keep or throw away, and how we fill in our time.

Some of the old equipment may be still in working order, but is too cumbersome or simply old-fashioned. Much of it would only need minor work by one familiar with the type to make it operable. But, most of it is unlikely to ever be worth spending time or money on when the new modern items are so much more attractive.

What is the time spent on such repairs (and building new equipment) worth?

Some can calculate it in terms of potential income from other activities. Others may look at it as their contribution to the history of amateur radio and the education of future recruits. Others again may simply enjoy the challenge and the satisfaction of success. But, even if all the out-dated rigs are in working order, is there any value in having a shelf full of them? When does a particular piece of equipment go from being an old piece of junk to being a valuable historic artifact? And who will take custody of it until then? Perhaps we need a National Trust of Historic Equipment!

On another aspect of costs, consider the value that the Institute is getting from its volunteer workers. My employer considers my time to be worth about $14 per hour. Many other office-bearers are worth (or are paid) much more than that.

Over the year I would probably average five hours per week on Institute business. Am I contributing $3640 value to the Institute in a year? If we calculate similarly for all our honorary office bearers, we find that members are receiving service worth hundreds of thousands of dollars at no cost to them. Little recognition, however, goes to most of the volunteers unless they hold a fairly high position.

What about the Round Tuit?

May I suggest that you do not wait until you get one. Most of our regular readers have in mind a comment they will commit to paper, an article or short note for AR, or an idea for contribution to Division or Executive "someday." Be assured that all of these are welcome at all times. The Institute can only function on the input from members.

With the 1988 Federal Convention coming closer, it is important for all members to contribute to the discussion of items which will be raised at the Convention, so that your councillors will know your views. Too often we hear complaints that "They should have asked us..." when what is really meant is "I didn't listen to the earlier discussion about..." or "I didn't bother to answer..."

Your contribution of time or ideas may not be tax deductible, but it is these contributions that keep the Institute functioning in your interest.

We look forward to hearing from you.
73 Brenda VK3KT

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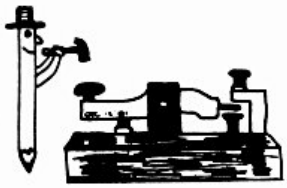
DEADLINE FOR MAY IS MARCH 21, 1988



Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

Welcome back . . . Now that we have had a month to brush up on our operating technique, we should be almost ready for the coming DX season. Hopefully the 80 metre band will also reflect a tidying up of operations, too.

If you have not already looked, check-out last month's column for some hints on operating technique. Apart from my own enthusiasm, my only qualifications are a vivid recollection of the mistakes I made only three years ago when I was learning. And a lot of reading, both manuals and contributor's letters, together with a few hundred hours on air.

This month I want to cover some of the better known operating practices. They are covered in the Call Book, the Amateur Operator's Handbook, and overseas handbooks as well, so I will be referring to them most of the time.

Real "on-air" operating is actually *easier* than the examinations. Everyone gets "butterflies" at first, but there is not the fear of failing hanging over our heads. The rules are available to you at any time, even while you are on-air, and a little practise will soon get rid of the butterflies. You can go on air and use plain English if you like, but it will waste a lot of time. Some amateurs may not work you because of this, as their operating time may be restricted and they will want to make the best of it by using abbreviations, full QSK, etc. Most amateurs use abbreviations so you can copy down the ones you hear, making a list that you can pin in front of you while operating. You can even write down some of the things you want to say, as it is easier at first, to send from 'copy'.

Here is the recognised form of CQ call — it is called the three by three call.

CQ CQ CQ DE VK3CQ VK3CQ VK3CQ AR K

Many operators have their own preferences, some will call CQ 10 or even 20 times, then their call a few times and may even repeat that before sending K. This is okay if they are using full break in (QSK) so that you can interrupt them, but unfortunately most are not using break in and you have to wait.

If you are in a hurry, you can shorten the call to something like CQ DE VK3CQ K, especially if you think someone is listening on the frequency.

If you hear calls like CQ RD . . . CQ TEST, CQ N, CQ FD, etc, these are people who are competing in contests. They will only send you a RST report followed by some more digits and they will expect you to do the same. Have a good listen beforehand to find out what is going on, they will usually slow down for you.

Okay, now that you have sent CQ, here is what a reply should sound like.

VK3CQ DE VK3CDU VK3CDU VK3CDU KN

Your own call is sent once only, you are expected to know it well enough. The other call is a new one for you so it is sent three times. The prosign KN means that only the station called should answer.

AR means 'end of message'. At the end of the contact you will hear something like,

. . .73 ES CUL AR VK3CQ DE VK3CDU SK E E

AR (end of message) is usually put before the call signs, and SK is the abbreviation for 'end of work'. E E can be likened to a wave and is answered by a single dit.

Another ending you can send in place of SK is the prosign CL, this stands for CLosing down. It tells listeners that you are switching off so that, if they call you, they will not be heard. This can be helpful on a net as the other operators will know you are not listening.

The character you had to learn for the examination, ie NK, is not normally used on-air by amateurs so don't worry if you forget it.

Following is a list of a few of the most used abbreviations, keep the list handy until you are proficient with them. It won't take long.

GE	Good Evening
GA	Good Afternoon
GM	Good Morning
FER	For
UR	Your, You Are
ES	And
CPI	Copy
RX	Receiver
ANT	Antenna
TU	Thank You
CUL	See You Later
OM	Old Man
YL	Young Lady
TNX	Thanks
U	You
FB	Fine Business
HW	How
RIG	Transmitter
TX	Transmitter
WX	Weather
GL	Good Luck
BCNU	Be Seeing You

See your Call Book for many more abbreviations and keep a copy on the shack wall.

IN SUMMARY:
Listen
Three by Three calls or shorter
Call CQ slightly slower than you can copy
Use Q codes and abbreviations (learning will come with use)
Identify every 10 minutes, at the start and end of every over is unnecessary
Keep overs short
Wait a few seconds between overs

MORSUM MAGNIFICAT

Owing to the serious illness of Rinus PA0BFN, the Dutch end of MM will cease operation after the winter issue. Tony Smith G4FAI, is currently arranging to continue the English edition from London. For the moment, all inquiries and subscriptions for MM should be sent to Tony at 1 Tash Place, London, N11 1PA.

FROM NEW ZEALAND

Gary ZL1AN, who writes *The Morseman* for *Break In* tells me he will be investigating the teaching of Morse during this year with a captive stage three Psychology class at the University. He will be using a program called *Teach*, which teaches Morse from scratch using an adaptive algorithm geared to the progress of the student. The program runs in Basic on the Commodore C64 and IBM clones. If you are interested in the program, let me know and I will se if I can get a copy.

73. . .Gil VK3CQ

ar

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

Further to the news in this column (AR February, 1988) the Radio Pakistan had vacated 7.100 MHz; apparently Radio Tirana (Albania) has now ensconced itself there. Their second harmonic is being reported in Europe on 14.200 MHz. ***You lose one, you gain one ! ! !***

The broadcast being heard last October on 14.025 MHz was Radio Algiers. One of their engineers seemed to have confused 14.025 with 15.205? ! ?!

Please let me know if you hear AXM (Royal Australian Navy) sending FAX and RTTY (50 baud, 850 Hz shift) on 14.002 MHz. This is a spurious coming up from 13 MHz.

Reports were received last November from: VK2s AWA, EYI; VK3XB; VK4s AKX, BHJ, BTW, DA; VK5s GZ, MX, TL; VK6RO; VK7RH; VK8s HA and JF.

Thanks for your support.

There were 86 broadcast mode intruders reported; 228 using CW, 156 using RTTY, 118 using other modes, and 35 intruders identified themselves on-air. The frequencies of 14.070 and 14.100 MHz seemed to be the most abused section of our 20 metre band for the month.

My own good news is that I have acquired a RTTY system. I can now send and receive RTTY (and CW, ASCII) and generally snoop around and see what is happening on yet another mode. Good fun, but I must admit it was a bit of a chore to get it up and running. Naturally, of course, Murphy came with the equipment . . . talk about RF in the shack! But it is mostly fixed now, and I am having a lot of fun with it. So far I have missed QSOs with seven different countries!

MODE FOR THE MONTH — B9W

And, on to the mode for the month, which is B9W.

Like the R7B mode, B9W is now a mode that can be used legally by radio amateurs. B9W is phase modulated pulse multi-channel transmission. It has a whining sound, a little like a distant jet aircraft. Often it is accompanied by two guard carriers, usually 3 kHz apart.

B9W signals can be considered intruders on the following frequencies:

On the 80 metre band	between 3.500 and 3.700 MHz;
On the 40 metre band	between 7.000 and 7.300 MHz;
On the 20 metre band	between 14.000 and 14.250 MHz;
On the 10 metre band	between 21.000 and 21.450 MHz;
On the 10 metre band	between 28.000 and 29.700 MHz.

See you next month, when we will talk a little about facsimile (FAX), which is R3C or F3C.

73 de VK2COP

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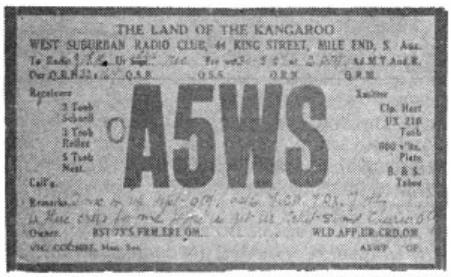
QSLs from the WIA Collection

Ken Matchett VK3TL
HONORARY CURATOR
PO Box 1, Seville, Vic. 3139

The QSL, OA5WS, dated March 1927, is an example of one of the oldest Australian OA prefixes.



In the earliest days of radio transmission, QSOs were local affairs and consequently there was no need for QSLs to indicate the country of origin. The call, 5WS, could be on a QSL card from Australia, USA or Great Britain. Later, in about 1923, when DX was really starting and transmissions were being made between different countries, there arose a need for better identification. Thus letters of the alphabet were used to indicate the country, A for Australia, U for USA, G for Great Britain and so on. This DX success was due to the commercial availability of the wireless valve in the early 20s and the use of far shorter wave lengths than had previously been the case. (Spark transmissions were more efficient at long wave lengths).

Still later, in early 1927, the Australian prefix A was changed to OA. Similarly, New Zealand changed from Z to OZ. This QSL is interesting in that the licencee has added an "O" to the A with a rubber stamp to make the OA prefix. The shortwave listener's report dated March 30, 1927 was just a couple of months after the new call sign prefix was adopted. The QSL is made out to the initials of the shortwave listener, SWL reports being very welcome by radio licencees in those early days.

The QSL, AC2AY, dated March 1931, is an example of one of the older Chinese prefixes. Before the recognition of amateurs (as distinct from the licencees of experimental stations), a system of so-called internations "intermediates" was used between the amateurs of one country and another. A set of two letters in the call indicated both the continent (eg O = Oceania, A = Asia, etc) and the country. Thus China's prefix was AC, just as Australia's was OA.

This call was then followed by the "intermediate" de (from) followed in turn by the call sign of the transmitting station. In 1929, following the Washington International Radiotelegraph Convention these intermediates (used by member nations of the International Amateur Radio Union (IARU) were replaced by internationally agreed prefixes, the allocation for China being XGA-XUZ. It was then up to the individual Government body to decide on the actual amateur prefix (or prefixes) to be used from this allocation. Although the government of China did assign the prefix XU at a later date, radio amateurs in China continued to use the old intermediate of AC. Johann Chiang of the Custom House, in Tientsin, was one such example.

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Magazine Review

Roy Hartkopf VK3AOH
34 Toolangi Road, Alphington, Vic. 3087

G — General
C — Constructional
P — Practical without detailed constructional information
T — Theoretical
N — Of particular interest to the Novice
X — Computer program

QST — August 1987. 435 MHz Amplifier (C). Radio Emergency Service (G). Tour through Britain (G).

BREAK IN — December 1987. 60th Anniversary Issue (G).

CQ-TV — No 140, November 1987. British Amateur Television Club. News, Circuits, Reviews, Contest, etc (G).

AMSAT-UK OSCAR NEWS — No 68, December 1987. General Satellite News, Tables, Information, etc (G).

CQ MAGAZINE — November 1987. Packet Radio (G). Ideas for Cheap Antennas (P N). Satellite Update (G).

CQ MAGAZINE — December 1987. 40 metre, three element Beam (G). Coaxial Link Antenna (P N).

RADIO ELECTRONICS — December 1987. Index for 1987. (G). Early Days of Radio (G). Using an Oscilloscope (G N). Strain Gauge Transducers (G).

73 MAGAZINE — November 1987. Tesla High Voltage Transformer (C). VIC-20 Beam Rotor Interface (P X).

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HAMADS

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write ***each*** on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. ***Please do not use scraps of paper.*** Please remember your STD code with telephone numbers

AMSAT Australia

SATELLITE ACTIVITY FOR THE MONTHS OF OCTOBER/ NOVEMBER 1987.

1 LAUNCHES

The following launching announcements have been received:

INTL NO 1987	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INC deg
090A	USA 27	Oct 26	USA			NA	
091A	Cosmos 1894	Oct 28	USSR	24hr02m	35920		1.3
092A	Cosmos 1895	Nov 11	USSR	90.4	402	217	70.4
093A	Cosmos 1896	Nov 14	USSR	89.4	319	203	64.8
094A	Progress 33	Nov 21	USSR	88.8	268	193	51.6
095A	TV-SAT 1	Nov 21	Germany			NA	

2 RETURNS

During the period 58 objects decayed including the following satellites:

1987-059A	Cosmos 1866	Nov 06
1987-081A	Cosmos 1886	Nov 02
1987-082A	Progress 32	Nov 19
1987-085A	Cosmos 1889	Oct 23

3 NOTES

1987-095A TV-Sat 1 was launched by an Ariane 2 rocket from the Kourou European Space Station. It is the first German direct receivable broadcasting satellite.

Updated information on spacecraft with essentially continuous radio beacons on frequencies less than 150 MHz:

1966-110A ATS 1	38.5 deg W	136.46 & 137.35 MHz
1967-111A ATS 3	105.30 deg W	136.47 & 137.35 MHz
1975-100A GOES 1	125.40 deg W	136.38 & 125.40 MHz
1977-014A ETS 2	129.90 deg W	136.11 MHz
1977-048A GOES 2	113.40 deg W	136.38 MHz
1978-062A GOES 3	129.60 deg W	136.38 & 137.19 MHz

—Contributed by Bob Arnold VK3ZBB

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AMSAT-UK

A note from Ron Broadbent G3AAJ, Honorary Secretary of AMSAT-UK, includes the information that AMSAT—UK will pay the costs involved (£stg13 500) in transport of the Phase IIIC satellite from Germany to French Guyana. The launch of OSCAR 13 is planned for May 20, 1988.

Contests

Frank Beech VK7BC
FEDERAL CONTEST MANAGER
37 Nobelius Drive, Legana, Tas. 7251

CONTEST CALENDAR

MARCH 1988

5 — 6 ARRL DX Phone Contest
12 — 13 QCWA Phone QSO Party
12 — 13 RSGB Commonwealth CW Contest (Rules December AR)
19 — 20 WIA John Moyle Memorial National Field Day Contest (Rules February issue)
19 — 20 NZART National Field Day
19 — 20 ISSB Phone QSO Party
19 — 20 BARTG Spring RTTY Contest (Rules February issue)
26 — 27 CQ magazine WW WPX SSB Contest

APRIL 1988

9 — Israel ARC Contest

Steve VK2PS, was the highest scoring VK station in the 1987 HA Hungarian CW Contest with his 14 MHz single band entry. This is a good contest for those of you who like this mode and can provide a lot of hard-to-get CW countries. Look out for it on the third weekend of January each year.

Rules for the Russian CQ M Contest will be published next month and this is another good contest for those who are looking for the more rare Russian call areas.

Remembrance Day Contest 1987; some States did better and some did not do as well as they did in 1986. The Queensland Division pulled out all stops this year and have reaped the reward. I have received quite a lot of correspondence regarding the rules as laid down for the RD Contest and will study it after the paperwork involved with the 1987 contest is filed away. I was surprised at the number of amateurs who used more than one call sign during this contest, a few put in two entries and some even four! This is what I meant by the term "spirit of the contest" in my column in January's AR. The call sign is issued for the identification of a radio station, not an individual who is identified by his or her name. At least, that is how I interpret the rules. It follows, I think, that a range of apparatus being used by an amateur in a contest cannot be station XXX and station YYY and ZZZ. Surely, if a club cannot find a licenced amateur to operate a club station exclusively in a contest, there must be something lacking with the membership. Please, ***one station, one call sign!***

An amateur who has sent in his log for the Ross Hull VHF Contest has informed me that a number of people cannot understand the reasoning behind the daily start of contest serial numbers in this rather long contest. This rule change was inserted to try to hide the performance of stations during the contest, you all know the feeling of getting the station on the air a few hours after the start and of hearing someone in VK10 with a serial number up in the hundreds. Well, this minor rule change was to try and encourage a few more to "give it a go."

COMMENTS ON THE RD CONTEST

Once again I enjoyed the contest . . . I did find the going very slow at times. I think that I had worked just about all that could be worked. The 80 metre band was terrific on the Saturday evening, and 40 was also good. 20 metres was nowhere near as active as in past years and 15 was useless whilst I did not even bother to look at 10 metres. Maybe I missed out there, however I doubt it. One of the highlights of the contest was being called in the middle of same by an FR5 on Reunion Island on the 80 metre band . . . About my only criticism of operators during the contest is that of those who do not use the standard phonetics. Using the phonetics from the internationally recognised phonetic alphabet makes it so much easier to get the call signs through the QRM and cross modulation . . . Right throughout the contest I found nothing but courtesy. From this point of view I probably enjoyed the 1987 contest more than any others previously. VK5QX.

Thanks for the letter Ian, glad you now have time to enjoy the contests these logs sure do keep a person off the air! . . . FCM.

Please find enclosed the VK3SCD log for the 1987 RD Contest. VK3SCD is the club call sign of the Cheltenham District of the Scout Association. As you will see from the declaration on the log, three of us operated the station during the contest. Equipment on HF was an FT102 and dipoles while on VHF an FT290R with 25 watt linear and a Slim Jim antenna were used. Logging was done on my IBM clone using software written by Geoff VK3CGH. I was of the belief that the primary contest objective of the RD was to assist your State to win. Unfortunately, the current rules encourage an operator to channel his efforts into only one section. This certainly maximises the opportunity of gaining a certificate, but detracts from the State's overall score. I would prefer to see the sections scrapped. Perhaps offering a multiplier for CW and other more exotic modes might also encourage their use . . . Despite what I've just written, I enjoyed the contest very much. Activity on HF was excellent, although the number of two metre operators seemed very poor compared to previous years . . . VK3CRA.

I would like to see a VK version of the Commonwealth CW Contest . . . FCM.

My score is down this year because of enforced retirement early on Saturday night due to a "force majeure" at the time. I estimate that this probably cost me 200 contacts . . . Goodwill seemed again to be the tenor of the contest. Things were very quiet toward the end though, and it was hard to really justify the last two or three hours effort in the score. Quite clearly Saturday night is when it all happens . . . VK5ATN.

This was my third contest though I have given out numbers in others. I was late in starting on Saturday night as I had a short in my power supply and I'm also re-wiring my shack, so my time is limited. My favourite contest is the sprints although I enjoy all of them. I have realised why I have not done well in the contests, as I made contact with every station I could hear. (In the Sprints), but I only have access to the novice bands, and that is where I am losing out . . . VK2LEE.

Yes Lee, the novice entries are very few, however in VK7 we appear to have an above average number of novice entries for which we down in the Apple Isle are very grateful . . . FCM.

Just a note to say how much I enjoyed the contest, it is only my second time around, but I believe the RD has all the ingredients of a successful and rewarding contest, namely;

1. The significance of the day.
2. The simplicity of the rules.
3. The spirit in which it is held.

And there is still enough for the serious contester . . . VK4BAY.

This was the first contest that I had been able to put in a few very enjoyable hours, (previously weekend work commitments had prevented this). The small amount of time that I was able to spend exchanging numbers led to some very friendly contacts. Even the "big score" stations had time for pleasantries and the general on-air manners of my fellow amateurs made me feel proud to be a part of this great hobby of ours. The RD Contest certainly lived up to its other name — "The Friendly Contest". Catch you next year . . . VK2MT.

This years Remembrance Day Contest went very well. Band conditions were good at my QTH, lots of activity (and QRM) on all bands, and great to see 15 metres open. I had to take breaks Saturday night to check on cows calving, and Sunday to milk and feed out hay, etc. Standard contest operating procedure here . . . VK3YH.

After missing last years RD Contest, I was looking forward to "going bush" again this year and getting stuck into it. Apart from no opening on 10 metres at all into central VK7 and only working four VK6 stations on 15, I consider the 1987 RD was the most enjoyable from the manner in which fellow amateurs conducted the contest. It rated as the most gentlemanly conducted RD I have taken part in. I only hope that future contests are as enjoyable and the old practice of frequency jumping and stealing is a thing of the past. (I did not experience this at all this year). . . . VK7KZ.

Thank you for an enjoyable RD contest. Band conditions were better this year and attracted more station to the contest. The stations I worked on CW were the familiar call signs I remember over the few RD Contests I have entered. It looks like CW is out with novices and K calls, I only worked three out of my 102 QSOs on CW. I will be looking forward to next years contest . . . VK2DQP.

Thanks for taking on the FCM job, it will keep you busy as I've done it years ago, however contests allow us to QSO so many old friends we only hear once in a while. Particularly RD Contests. I've not missed too many RDs since inception, now an old Returned Soldier, 71 years of age. Wonder if I will stand the pace of having 500 plus contacts for many more years but will keep trying. VK4LT. PS. Conditions here not very good on 40 and hopeless still on 10 metres but the cycle is on the way back.

Participation in the RD Contest has always been a pleasurable experience and was my introduction to contesting. I have entered the HF transmitting phone and CW segments and the VHF phone segment. The old "Open" section was more fun to operate in as there were more stations competing and the tactics required were a real challenge. The checking of logs and totalling of scores would have been easier too. Still, I am not one to pull out because the rules are not exactly to my liking so I have operated within the current rules and the spirit of the contest . . . VK3VT.

Conditions here on Saturday night were poor due to the high static level. I was surprised at the lack of use of the 160 metre band, thought there would be greater activity. The use of CW was disappointing, I was amazed at the few novices who used CW, particularly on 80 metres, perhaps the inclusion of an "Open" section may encourage this mode, keeping a separate log deterred me from as much CW as I would have liked . . . You asked for details of any of the call signs of those who died in WWII. I was closely associated with C A Ives VK5AF. Cec, a commercial artist, was licensed in 1936 and was operating at Glenelg pre-war. As a member of the RAAF Wireless Reserve, Cec, together with Ross Harris VK5FL, a neighbour left for Melbourne on the Tuesday after war was declared and went to Point Cook for their initial training, then to Victoria Barracks for service as a WT op. Unfortunately, in early 1941, Cec contracted viral Pneumonia for which there wasn't much cure in those days and passed away. Cec was an excellent CW operator and helped me a lot during my struggle for the exam in 1938 . . . VK2BO.

1987 REMEMBRANCE DAY CONTEST RESULTS

— Congratulations to VK4 — The Sunshine State

The formula for determination of results for each Division is:

Number of Logs/Number of Licencees (participation) X Total Points X Weighting Factor (average of last four weighting factors).

VK1 57/352 X 6245 X 1.05 = 1061.827
VK2 120/5117 X 13144 X 7.04 = 2170.027
VK3 74/4872 X 9086 X 5.41 = 746.609
VK4 117/2834 X 13670 X 5.58 = 3149.116
VK5 104/1779 X 13913 X 1.36 = 1106.157
VK6 142/1513 X 16608 X 1.6 = 2493.942
VK7 52/617 X 5495 X 2.23 = 1032.738
VK8 8/185 X 564 X 9.56 = 233.160

Unfortunately, logs from all States except VK5 and VK7 did not adhere to the criteria and were used as check logs. These are not listed.

The standard of logs presented was generally very good and the vast majority arrived at this QTH well inside the closing deadline. Some of the entries like the computer printout in the form of a seven metre log paper roll are not funny. One or two are very untidy and many hours had to be spent on them and these almost entered the file of disqualified entries. However, the very high standard of the vast majority made the process of checking the entries a hard but pleasurable task.

DIVISIONAL SCORES

VK1	
HF Phone	4186
VHF Phone	2025
VHF CW	34
Total	6245

VK2	
HF Phone	11124
HF CW	1510
VHF Phone	510
Total	13144
VK9NP 344	

VK3	
HF Phone	6251
HF CW	1061
VHF Phone	1774
Total	9086

VK4	
HF Phone	10320
HF CW	1096
VHF Phone	2254
Total	13670

VK5	
HF Phone	9840
HF CW	688
VHF Phone	3385
Total	13913

VK6	
HF Phone	6205
HF CW	640
VHF Phone	9704
VHF CW	59
Total	16608

VK7	
HF Phone	4713
HF CW	120
VHF Phone	662
Total	5495

VK8	
HF Phone	408
HF CW	156
Total	564

OFFSHORE SCORES

VK9NP	HF Phone	344
P29KRP	HF Phone	106
ZL1ADN	HF Phone	160

VK9NP This score is added to the VK2 Divisional total.

LICENSEES PER DIVISION ARE.

VK1	352
VK2	5117
VK3	4872
VK4	2834
VK5	1779
VK6	1513
VK7	617
VK8	185

INDIVIDUAL SCORES BY DIVISION

VK1 HF Phone

1PJ	520	1TD	209	1VE	83	1KV	26
1WI	431	1HZ	185	1DW	81	1DE	24
1GB	431	1RH	120	1LF	81	1NDV	20
1RJ	427	1GN	116	1NEB	62	1VP	16
1BEB	356	1KL	94	1KCM	56	1KRM	14
1ZL	280	1MX	93	1VB	44	1BBA	10
1WX	270	1BH	84	1PP	43	1BAT	10

POINTS SUB-TOTAL 4186

VK1 VHF Phone

1KRM	258	1WI	100	1MX	71	1DE	27
1ZAR	143	1GL	95	1RH	55	1PP	21
1HZ	121	1PJ	90	1BAT	46	1KV	20
1GN	121	1TD	90	1ZAH	45	2ZZX/1	17
1WX	120	1ZL	87	1LF	43	1VP	10
1ACC	120	1ZJR	85	1ZQR	29		
1GB	100	1DW	83	1BBA	28		

POINTS SUB-TOTAL 2025

VHF CW

1RH	13
1UE	11
1MX	10

Sub,Total 34

TOTAL POINTS VK1 DIVISION -------- 6245

VK2 HF Phone

2KL	578	2CKW	178	2IV	81	2OH	41
2ZL	543	2EXA	170	2BTZ	80	2PC	38
2DCL	515	2DQP	165	2ALZ	80	2NCE	37
2DYW	489	2DUA	160	2DLB	79	2KGX	36
2BO	459	2APP	150	2CDP	77	2AL	33
2DM	426	2CFH	140	2VR	74	2DDW	33
2AOA	422	2AGF	139	2AJO	70	2ENX	33
2MB	386	2BQS	127	2AZS	61	2KUR	33
2BTP/P	300	2MUZ	120	2FJ	60	2XF	29
2NW	288	2PN	112	2END/P	56	2RX	26
2PS	264	2PU	112	2PY	53	2BVU	25
2EAR/P	252	2CN	111	2SP	52	2NV	25
2ANO	243	2RE	110	2BMX	51	2CU	20
2ECF	233	2UC	105	2BDT	50	2AAB	19
2EAG	226	2CDD	101	2AYF	49	2AIM	15
2WI	219	2CJH	100	2KW	48	2XT	14
2PD	217	2FEI/qrp	99	2GV	47	2LA	12
2DWT	200	2DBB	86	2EY	47	2AKX/P	12
2ELB	184	2AIC	84	2LEE	45	2WT	11
2DFL	180	2MT	82	2HT	42	2ED	11

POINTS SUB-TOTAL VK9NP 344 11124

VK2 HF CW

2KM	146	2EJW	72	2AIC	43
2AQF	113	2EL	71	2SU	32
2II	104	2QL	63	2BO	29
2BO	103	2GT	63	2CWS	29
2DQP	102	2AZR	56	2AAB	18
2DID	100	2CDG	51	2EMU	16
2BRA	84	2BLK	50	2FNR	15
2BQQ	74	2EXN	50	2RJ	14
				2BQS	12

POINTS SUB-TOTAL 1510

VK2 VHF Phone

2HT	75	2XDW	44	2EY	35
2AKY	68	2CDD	40	2ELB	27
2JGH	52	2ZZX	38	2WI	16
2FGV/P	50	2APP	36	2BUT	15
				2AIC	14

POINTS SUB-TOTAL 510

TOTAL POINTS VK2 DIVISION ------13144

VK3 HF Phone

3BSH	511	3AXE	238	3CAY	109	3BGY	50
3YH	486	3AYF	230	3DVT	103	3BSR	41
3AJU	402	3CX	228	3DNC	102	3KAV	40
3ZI	379	3VT	225	3PW	101	3PTR	31
3CUH	357	3AGJ	180	3ZJ	100	3WW	31
3ADW	357	3BRZ	176	3KCT	83	3ARO	27
3SCD	339	3ABP	147	3BQU	78	3ALD	26
3AKK	338	3SM	134	3BMV	57	3DNY	22
3KU	297	2FII/3	126	3NV	50	3CLS	20
						3BCZ	20
						3PSG	10

POINTS SUB-TOTAL 6251

VK3 HF CW

3CQ	175	3XB	68	3AMD	35	3PSG	18
3XF	162	3KS	65	3BDH	33	3AJG	17
3FC	107	3CUH	53	3OA	31		
3KF	89	3BDU	38	3XF	30		
3DG	73	3VT	37	3DNC	30		

POINTS SUB-TOTAL 1061

VK3 VHF Phone

3BGS	208	3CWT	119	3KST	69	3AOM	21
3VT	190	3XMW	114	3AVV	61	3CLS	18
3DSI	188	3KPQ	110	3SM	60	3ADW	18
3XNG	151	3SCD	95	3DNY	60		
3BMV	140	3XB	76	3KCT	46		

POINTS SUB-TOTAL 1744

TOTAL POINTS VK3 division -----9086

VK4 HF Phone

4YB	655	4BTW	201	4NFE	79	4NVI	31
4WIQ	539	4CI	189	4ABX	65	4ADY	31
4LT	520	4AOE	178	4BG	64	4ALM	30
4BTB	518	4OX	153	4BNL	63	4AIX	26
4ARR	514	4BIF	149	4SAA	57	4FVM	25
4WIS	482	4ASF	141	4CMH	56	4NLV	25
4AEV	452	4AEM	131	4QI	55	4NWX	24
4AKB	398	3ACW	123	4AMH	54	4BCH	23
4BAY	312	4PJ	122	4WY	52	4AGS	23
4BKM	311	4RM	121	4BKW	51	4IS	23
4YG	275	4AVC	120	4RF	51	4LP	20
4OL	262	4RT	120	4PU	50	4CF	16
4AQD	252	4JCR	115	4FBA	48	4ZN	15
4BCS	250	4NEF	111	4CZ	40	4AVR	15
4AOH	246	4RL	110	4BGT	33	4NYE	12
4WIZ	242	4NMA	108	4ALQ	32	4EV	11
4MWZ	232	4CPA	99	4YX	31		
4JM	227	4NVJ	80	4MAZ	31		

POIMTS SUB-TOTAL 10320

VK4 HF CW

4XA	194	4YG	66	4QY	40	4RE	25
4CAG	166	4BRZ	59	4XY	38	4APZ	18
4XW	165	4QI	55	4GD	38	4CF	15
4JH	137	4XJ	45	4SF	25	4EV	10

POINTS SUB-TOTAL 1096

VK4 VHF Phone

4WIZ	326	4KCA	87	4YAN	53	4EV	29
4ZBV	166	4KAP	86	4KZA	50	4IY	25
4AG	138	4ZXZ	77	4BNL	47	4GT	20
4ZGQ	122	4AHD	77	4PJ	45	4AIZ	19
4YJF	118	4KZS	74	4ADB	36	4AVR	17
4AVC	116	4ZML	62	4YAF	35	4VS	16
4KLA	107	4ANN	59	4SAA	34	4RF	10
4KJE	105	4ABX	55	4ZDV	33	4KU	10

POINTS SUB-TOTAL 2254

TOTAL POINTS VK4 DIVISION -----13670

VK5 HF Phone

5QX	788	5GZ	194	5RV	94	5RK	42
5AYD	667	5OV	176	5BWG	86	5NVW	41
5ADD	574	5ALM	167	5ST	77	5BWF	37
5BT	447	5AJW	154	5SS	71	5TY	36
5SG	444	5AX	150	5TP	70	5QW	33
5ATN	441	5BMT	149	5ANW	67	5ZJ	33
5ATU	404	5NF	111	5PC	67	5EJ	30
5XY	328	5KV	109	5AO	66	5TC	27
5ALE	298	5NTX	108	5KMH	65	5ZQ	25
5NX	257	5IT	108	5UE	59	5AOV	25
5DJT	238	5GV	106	5AAJ	56	5PWF	20
5APR	232	5AH	104	5AGB	56	5KJT	15
5ACW	230	5XC	104	5NDB	52	5LC	15
5AAC	228	5SG	104	5NGM	52	5SW	27
5WO	215	5ANI	103	5BVJ	50		
5NOD	211	5AJK	101	5ZA	50		
5AIB	200	5BFB	97	5NID	49		

POINTS SUB-TOTAL 9840

VK5 HF CW

5AGX	186	5TL	30
5UM	174	5SW	27
5GZ	91	5JG	26
5FX	76	5ALM	20
5HO	31	5PDH	17
		5KL	10

POINTS SUB-TOTAL 688

VK5 VHF Phone

5KCX	365	5RR	153	5BMT	104	5ZTJ	52
5AKK	305	5TC	150	5XY	96	5ZHV	47
5GR	212	5KLH	139	5OR	77	5SS	38
5FK	206	5ACC	139	5NX	73	5ZKK	32
5ZDJ	205	5OZ	128	5PC	68	5OU	30
5KIA	192	5ANW	119	5KEM	66	5ACW	28
5AH	161	5RV	109	5ZCQ	64	5TY	27

POINTS SUB-TOTAL 3385

TOTAL POINTS VK5 DIVISION----------13913

VK6 HF Phone

6ED	442	6HT	170	6UX	60	6ANT/P	25
6ABP	424	6RU	166	6QN	60	6ARD	25
6AVO	416	6UF	126	6NRN	55	6BO	25
6DA	374	6XC	109	6APK	50	6JO	24
6AO	286	6FC	106	6CZ	42	6NE	23
6AMB	250	6AP	101	6CX	41	6ABR	22
6LW	234	6SAA	97	6UT	40	6SA	21
6RG	233	6FP	94	6SH	38	6CJ	20
6ACN	231	6XQ	92	6YF	36	6RO	19
6NTJ	215	6NBF	88	6AV	35	6NBG	19
6ANC	209	6NWD	86	6RO	33	6ABL	18
6YS	201	6HU	82	6AN	28	6OE	14
6OD	200	6DE	81	6KH	27	6XZ	10
6JP	190	61W	69	6PF	25		

POINTS SUB-TOTAL 6205

VK6 HF CW

6AFW	144	6SM	64
6HQ	125	6BE	39
6ABP	122	6LW	30
6AJ	71	6RU	28
		6WT	17

POINTS SUB-TOTAL 640

VK6 VHF Phone

6XZ	557	6AD	188	6ARD	116	6ZLT	65	6ZTL	35
6YS	535	6JP	185	6SO	114	6ABD	64	6MS	34
6OD	439	6YJ	175	6AP	111	6AWE	63	6UV	34
6CX	390	6ACN	174	6ZPP	105	6ABL	61	6BO	33
6ZLZ	342	6QX	174	6VF/P	105	6NE	61	6MB	29
6ASR	286	6WH/P	158	6KWN	105	6DY	60	6ON	25
6RG	252	6ARO	152	6BD	100	6RU	60	6ZES	20
6AR	250	6RO	152	6HU	99	6AN	57	6JY	18
6WI	242	6AO	142	6KBL	89	6UT	55	6ZGP	17
6ABR	239	6FC	141	6SAA	87	6QN	55	6GK	17
6ANC	236	6XV	136	6EB	86	6OTN	48	6ZAG	12
6LZ	229	6RRG	133	6ML	86	6RZ	44		
6ZIC	229	6WZ	131	6OJ	76	6JX/P	38		
6YF	226	6WT	130	6AMB	68	6IW	38		
6APK	223	6YL	121			6GA	37		
6XC	191	6SH	119						

VK6 VHF Phone POINTS SUB-TOTAL 9704

VK6 VHF CW

6WT	18
6AR	15
6YS	14
6FC	12

POINTS SUB-TOTAL 59

TOTAL POINTS VK6 DIVISION -------16608

VK7 HF Phone

7KZ	499	7NGC	211	7KDR	71	7BC	47	7FD	20
7FM	432	7NXA	205	7NWR	69	7NDO	35	7AK	20
7GG	391	7KR	200	7JK	62	7GB	29	7NBF	22
7KC	386	7KDV	149	7LS	60	7IY	23	7DT	27
7YP	284	7JU	122	7NIM	60	7BM	23		
7RN	268	7CK	118	7RH	56	7NPA	23		
7NRR	246	7AL	88	7EB	56	7NYW	25		
7HW	237	7BJ	80	7NGH	49	7JP	20		

POINTS SUB-TOTAL 4713

VK7 HF CW

7RY	76
7IY	24
7AK	10
7NXA	10

POINTS SUB-TOTAL 120

VK7 VHF Phone

7ZBX	150	7JK	49
7RY	76	7ZRP	47
7RM	63	7ZBW	41
7FB	59	7LS	36
&EB	54	7AL	19
7ZJG	51	7GD	17

POINTS SUB-TOTAL 662

TOTAL POINTS VK7 DIVISION ---------5495

VK8 HF Phone

8AV	211
8NOD	101
8NPL	39
8NW	30
8NGP	27

POINTS SUB-TOTAL 408

VK8 HF CW

8AV	106
8IIA	38
8HS/8	12

POINTS SUB-TOTAL 156.

TOTAL POINTS VK8 DIVISION -----564

RECEIVING SECTION RESULTS

Seven entries received in this section so I have listed them in order of score

HF SECTION

K Hartley (WA)	442
VK2PXC	324
L60228	265
L60036	247
L60068	184
L30477	170

VHF SECTION

L60036	78

Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU
EMC REPORTER
25 Berrille Road, Beverly Hills, NSW. 2209

BREAKTHROUGH

Advice pamphlet for RSGB Members
Compiled by the Society's EMC Committee

The Radio Society of Great Britain has drawn up a list of important measures which will help deal, to a greater degree than before, with the on-going problems of EMC (electro-magnetic compatibility). Three aspects of the situation need special attention.

The first is the inadequate standard of immunity of electrical equipment in general. This problem is already being addressed by the Society, the DTI and manufacturers. The Society's long-term aim is to make the manufacturers aware of the growing requirement for proper RF immunity and the consequent need to educate the relevant design departments. There should be a recognisable and substantial improvement in this area.

The second aspect is that we, as users of transmitters in what is often an urban environment, must ensure that we are 'whiter than white' before becoming involved in neighbourhood disputes. This means our installations must be 'clean' and that our own radio/television/hi-fi equipment does not suffer from RFI.

Thirdly, the shortcomings of a *few* radio amateurs do little to further the cause of harmonious relations with neighbours, retailers and even in some cases, manufacturers. This social aspect is most important.

This article goes some way to indicating those areas which are directly controllable by radio amateurs. It will hopefully enable us to eliminate most 'in-house' problems as well as providing some social directives.

If we can be seen to be putting *our* house in order, it will go a long way to encouraging the manufacturers to do the same. Much of the advice may appear to be common-sense, but it does no harm to repeat it.

ARE YOU TAKING THE RIGHT STEPS?

Tread carefully when talking to your neighbours about the problem of EMC. Try not to use the word 'interference' as this suggests an anti-social activity. It is far better to use the word 'breakthrough' instead.

All amateurs should strive to live in peace with their neighbours. From the outset, it is good policy to make friends with the people in closest proximity to your QTH. If relationships are amicable there is less chance of a dramatic change of heart if problems of breakthrough occur.

Sometimes a confrontation is unavoidable. When this happens, try to find a solution by co-operative means. Taking the attitude that "I'm allowed to run full legal power and therefore I'm going to, no matter what", will get you nowhere.

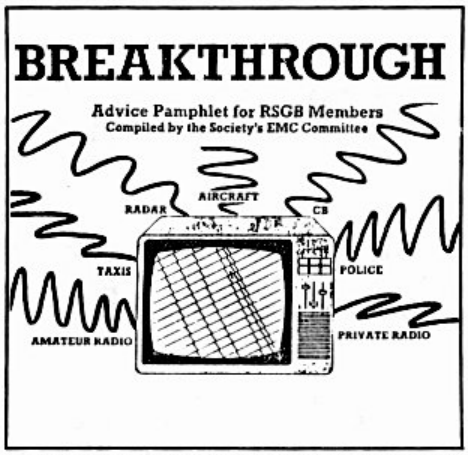
On the other hand, not going on the air for fear of upsetting your neighbours is almost tantamount to admitting that you are at fault.

When entering into discussions with your neighbours do not attempt to blind them with science. Your use of technical and baffling phrases could create further resentment.

It might be helpful to rehearse your procedure with a friend so you can work out an acceptable approach. You will then both know what to do, is and when you hear that dreaded knock on the door in the middle of your sched on 3.5 MHz!

If you are running a reasonable amount of power for the conditions prevailing and the problem still exists, do not avoid the problem but approach it in a diagnostic manner. Solving the problem often turns out to be a fairly simple affair. You do not need a degree in electronics, but merely be able to work in a reasoned logical manner.

Is your equipment blameless? Could you show a



neighbour that your transmissions do not interfere with your television, etc, which is in closer proximity? If you can show that:

a) transmission to your television = no breakthrough

b) transmission to his television = breakthrough,

then the logic should not be lost on him.

There is no single stock solution for all breakthrough but with patience and trial and error you can solve most of the problems.

So much for the social side of things; now read on for the more practical 'nuts and bolts' approach to the business of breakthrough.

Is your station designed for good EMC?

The chances are that, when you designed your amateur radio station (if in fact you did), the last thing on your mind was minimising breakthrough problems that might occur. Your licence includes a clause which requires that stations "shall not cause undue interference" to other wireless telegraphy (this somewhat dated phrase includes both radio and television).

The following guidelines explain how your station can be designed to reduce the chances of neighbours suffering breakthrough problems.

Take sensible precautions

These precautions will not guarantee freedom from breakthrough problems. However, if you carry them out, you can demonstrate to the authorities that at least you have taken the "undue interference" clause seriously. These steps are a good insurance policy for the future.

Take these precautions now, and you will not have the hassle of modifying your station in a hurry with a 'live' breakthrough case on your hands. It wouldn't look too good if you solve a problem by modifying your own station.

STATION LOCATION

Keep your station away from the neighbour's property

By your 'station' we mean the place where your transmitter is located. Every part of your installation will radiate some signals apart from those you expect from the antenna. Some signals may be harmonics or other spurii that your neighbour doesn't want nearby. Lengthen the odds against breakthrough and interference by keeping the station as far away from his property as possible.

Remember — doubling the distance from your transmitter to his television or radio will halve the strength of any unwanted radiation that he receives. Brick walls are almost transparent at RF, so even if your neighbour's equipment is not just the other side of the party wall, there is plenty of house wiring to carry your unwanted signals around his property.

Keep your HF station close to ground level

Many parts of your installation may need effective grounding. Keeping the ground connection leads short is easier if you put your HF station closer to the ground. This might also reduce the problem of RF feedback.

IMPROVE YOUR STATION DESIGN

Use an independent RF ground on your station

It is almost impossible to design a station that doesn't produce some unwanted RF signals on the case of the transmitter. These signals may find their way into the mains supply. You can give these signals a "good home" by grounding your station with an independent earth connection.

Any part of your station which handles RF signals at a high level will benefit from being well grounded. This ground will, however, only be as good as the lead connecting it to your station. The lead should be less than one-tenth of a wavelength to be effective. This means that even at 14 MHz the lead length needs to be less than seven feet.

Generally, this sort of grounding is ineffective above 30 MHz and so mains supply isolation will be needed. NB: Special precautions need to be taken if the mains electricity supply uses protective multiple earthing (PME). Consult your electricity board for further details.

Isolate or filter the station mains supply at RF

Even with an effective station ground, isolating the mains supply at RF with a filter is still worthwhile. Apart from keeping your RF signals out of the supply, it will also help to keep mains-borne interference out of your station.

Usually, a conventional mains filter (often called a hash filter) only filters the live and neutral conductors of the supply. The mains safety earth comes straight through, allowing most of the RF signals to bypass the filter altogether.

Effective isolation requires the use of a special mains filter which filters all three conductors. They are special in that the earth line is designed to carry fault currents of 100 amps should a short circuit develop on the station side.

A simple but effective filter can be made by winding the station's incoming mains supply cable through a number of ferrite rings. Make sure that all three conductors (L, N, and E) are wound through the rings together.

Screen all your equipment that carries high level RF signals

All this isolation and grounding will not do much good if any part of your station carrying high level RF signals is unscreened. Every such item should be well screened; this includes the transmitter, linear amplifier, power meter, output filter, and antenna tuning unit. Leaving the screening off any one of them could spoil the whole effect.

The internal fields within these items will be very high. Even if they did not contain any unwanted harmonics, the fundamental signal will still leap into anything nearby if you let it out. Apart from stray RF radiation being a potential health hazard, you might also produce unwanted RF feedback problems.

Use good quality coaxial cable within the house

Poor quality coaxial cable leaks RF signals! Try

putting a dummy load on the far end of one of your antenna feeders and fire up your transmitter. If you hold a sensitive field strength meter near the cable you should not be able to detect any signal. If you can, then the chances are that the cable leaks.

If your feeder runs indoors close to any equipment or house wiring, then this leakage could pass next door regardless of where your antenna is. (See also 'Where and when to use a balun').

Always monitor your output power with a reliable power meter.
If you can't monitor your output power whilst transmitting, then you can't be sure that you are no overdriving the transmitter. An over-driven transmitter will produce more harmonics and sometimes extra spurious signals, as well as extra splatter in-band.

If you are using SSB or CW then the power meter should respond to the peak envelope power level being the same as that selected during tune-up.

While operating, the peak power will always be higher than the steady state power, because all transmitter ALC systems are less than perfect (some much less perfect than others). Remember also that a VSWR meter may generate harmonics and should always be placed *before* any output filters.

Using a bandpass or low-pass output filter
On some commercial HF transmitters, the level of the harmonic output may still be high enough to cause interference to Band II FM radio. On VHF, the level of the harmonic output from 144 MHz can also cause problems to Band IV television transmissions.

All commercial transmitters produce some unwanted output signals. Although the level of these signals may be low enough not to cause trouble in most cases, use a good output filter unless you are sure that your transmitter is above reproach.

Select the right transmitter power for your QTH
Apart from being very bad value for money, running a few hundred watts to an antenna that is either indoors or below roof level is asking for trouble.

If you don't have the space or money to locate your station and your antennas away from your neighbour's property, then don't bank on being able to run high power on any band. If you expect the impossible from your QTH, then be prepared for the impossible neighbour!

CARE IN LOCATING YOUR ANTENNA

Locate your antenna as high as possible
Remember, the higher your antenna, the lower the chance of a signal finding its way into your neighbour's home (and the greater the chance that it will arrive at your contact's receiver). This is especially true when beam antennas are in use. Even small changes in height will sometimes place your neighbour's property outside the main lobe of the antenna.

Site your antenna well away from buildings
Whatever antenna you use, you should site it well away from buildings. This will minimise the signal strength inside the property.

Remember, the distance that matters is that from the nearest point of the antenna to the building. Make this distance as great as possible.

In any case, the increased distance may significantly reduce the interference *you* receive as well.

CARE IN CHOOSING YOUR ANTENNA

Choose the right size of antenna for your QTH
Select an antenna system that suits your property. Unless you live in a large detached property, fitting a large HF antenna into a small QTH will involve draping it over the house itself.

If this also brings the antenna close to your neighbour's house, then you may cause breakthrough even when using quite low transmitter powers.

Try using a smaller HF antenna sited away from the house. Although it may be slightly less efficient you may find the higher power you can use will give you an overall advantage.

Don't bring long wire feeds into the house
The long wire antenna is sometimes a poor choice. For good EMC, it could be disastrous as it brings radiated RF signals right into the building and picks up radiation from house wiring. Inevitably, the feed-point is too far from the earth connection, even if the earth is a good one, and the transmitter will be 'hot' with RF signals.

Often, most of the radiation takes place from the portion nearest the feed-point, which is generally far too low down. If you must use a long wire, move its feed-point well away from the house, and feed it with 50 ohm coaxial cable.

Provided the VSWR is less than 3:1 you may still be able to match the system with an ATU at the transmitter end. Alternatively, move the ATU to the far end of the feeder, and tune the ATU by remote control.

Use only screened antenna feeders near to buildings
A screened feeder helps you ensure that only your antenna radiates or receives signals. Although coaxial cable is the obvious choice for screened feeders, some balanced antenna feeders can be screened too. For instance, you can make a screened balanced feeder by tuning two 75 ohm coaxial cables side by side.

Join the screens together at both ends, and connect the two 'live' conductors to the antenna at one end and to the ATU at the other. Leave the screen at the antenna end floating, but connect the screens at the ATU end to the station ground.

If an antenna system design demands 600 ohm open wire feeder, you can use an ATU directly below the antenna with coaxial cable entering the house.

Where and when to use a balun
If you feed a balanced antenna (eg a dipole) from an unbalanced feeder (eg coaxial cable) then use a balun between the two.

We know it seems to work alright without a balun, but omit one and all sorts of things can go wrong; the two legs of the dipole will radiate unequal amounts of power, and the outer of the coaxial cable will radiate up to 30 percent of the power.

Not only will this distort the beam pattern of the antenna, but it will bring RF signals back into the house, just where you don't want them. In any case, leaving out the balun will allow the coaxial cable to pick up all sorts of radiation from the house wiring, and pipe them straight into your receiver.

Ground the screens of all coaxial cables before they enter the house
Even if you follow all the good practice guidelines, you may still end up with RF currents on the outside of feeder cables, where these currents result from direct pickup of the radiated signal.

You can prevent this RF entering the house by grounding the screens of the feeders with short leads, to an independent earth, before they enter the building.

PUT YOUR OWN HOUSE IN ORDER

Cure all major breakthrough in your home
You should cure all major cases of breakthrough in your own home prior to any lengthy transmissions. After all, if you cannot solve your own problems, you can hardly expect your neighbour to cure his!

A household free from breakthrough can be a powerful tool for dealing with an upset neighbour, and solving the problems will provide some useful practice. If your household is free from breakthrough, your own television and radio can give you an early warning if anything does go wrong with the transmitter.

Install your own television and radio efficiently
The equipment in your household should be a model of good practice. Use outdoor antennas for FM radio and television and ground their feeders where they enter the house.

If the signal is small, use larger antennas instead of masthead amplifiers. Buy a hi-fi system which is well decoupled. If you feel you cannot do these things, then you cannot expect your neighbour to do them either.

KEEP A GOOD FIRST AID BOX

Collect knowledge on EMC
Your shack library should contain at least one book on EMC. If you are conscientious then buy them all. Remember — they won't be much help unless you read and try to understand them. Knowledge is a most powerful weapon when dealing with EMC problems.

Keep a good stock of filters
Your neighbour will be much happier if you react to his breakthrough problem immediately. You don't have to provide him with any cures if you don't want to, but you should have a sample of each type of filter to show him exactly what he needs.

A minimum kit for the HF operator should be a braid-breaker, at least four ferrite rings, a high pass filter for Band II radio and a high pass filter for Band IV/V television. The VHF operator should keep at least four ferrite rings, and a selection of coaxial notch filters, one for each band he uses.

Keep an auto CW key and/or a two tone oscillator handy
Ideally, two people are required to investigate a breakthrough problem — one to operate the transmitter, while you visit the neighbour. You will sometimes need to investigate a case on your own. Driving the transmitter with an auto CW key or a two tone oscillator as appropriate, will allow you to do this.

Apart from the need for frequency identification, you should monitor the band at regular intervals to ensure that your signals are not causing trouble to other radio amateurs.

FURTHER HELP

If this article has inspired you to further action, it is important to know where to go and who to ask for additional advice.

Chapter 17 of the *RSGB Radio Communications Handbook* gives quite comprehensive coverage of EMC. This coupled with Chapter 40 of the *ARRL Handbook* could well form a basis of your background reading.

This EMC Report is a reprint of a very informative paper published by the RSGB in *Radio Communication* April 1987. It was contributed by Norman Burton for the interest of AR readers.

AR

QSP

HSC—SCHWEIZ
Amateur-Radio-Telegrafie High Speed Club HSC-Schweiz

The High Speed Club of Schweiz was formed in 1980 with the intention to cultivate harmonic co-operation with all people interested in amateur radio telegraphy. Club rules are written in five languages — German, French, Italian, Roman and English, a copy of which may be obtained by writing to the address at the bottom of this column.

The club is an entirely independent association with four types of membership — Honorary, Regular, Youth and Supporting members.

Further information write to:
Herrn Gunther Eichhorn
Hofackerstr. 39 Sulz
8544 Rickenbach-Attikon

Club Corner

EASTERN ZONE CONVENTION

"About 30 members of the WIA were present at the meeting, which was the first meeting of the newly formed Eastern Zone. The above number included eight Zone members, Chairman of the Victorian Divisional Council, President of the Victorian Division and two other members of the COuncil; also the President and a member of the Northern Zone.

"Election of Office Bearers: Moved by Mr Giddings VK3DG, and seconded by Mr Scott VK3SS, that Mr Williams VK3WE, was duly elected. Mr Jardine VK3PR, was nominated by the President for the position of Secretary and was duly elected."

The above is an extract from the minutes of the inaugural meeting of the Eastern Zone held at the Railway Hotel, Warragul, on Saturday, May 14, 1938.

This year, the Eastern Zone celebrates its 50th anniversary. To mark this historic event, the zone is organising a convention which will be held at Moondarra from May 13-15, 1988. Accommodation will be provided for up to 100 people and meals will be supplied from lunch on Saturday through to lunch on Sunday, inclusive. It will be a family occasion with activities planned for everyone including the children. Moondarra is a scenic area between Moe and Walhalla and is only two hours drive from Melbourne.

(Please mark this weekend in your diary now).

It is also of interest to note in the minutes of the first meeting that VK3WG, VK3UK and VK3XZ were conducting some experimental Ultra High Frequency work on five metres. They informed the meeting that spot frequency crystals would be available shortly for use on the five metre band.

More details and registration forms will be available in April AR. For further information please contact Chris VK3KME, Ph (051) 27 5656 or Bill VK3KBM, Ph (051) 27 7616.

—Contributed by Chris Morley VK3KME

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AUSTRALIAN AMATEUR PACKET RADIO ASSOCIATION

Packet radio is expanding rapidly in Australia, as it is world-wide. This would be apparent to all packet operators whether they are using the mode on the VHF or HF bands.

In promoting the use of the packet mode, the Australian Amateur Packet Radio Association is in the forefront of many new developments which are already in use and others which are projected in the future. Although the headquarters of the Association is in Sydney, it's 370 members come from all Australian States and from overseas.

The proliferation of Packet Bulletin Boards and Digipeaters, which must of necessity share a common frequency, produces chaotic conditions during peak operating times in metropolitan areas. However, at the same time, the spread of digipeaters has provided a new interest for country operators and has enabled long distance connects on VHF during "quiet" periods. Connects have been achieved between Sydney and Melbourne on 144 MHz, utilising digipeaters at Mittagong, Tumut, Wodonga and Shepparton. This network has since expanded to include Canberra, Wollongong, Orange, Newcastle, Tamworth and Coffs Harbour with other digipeaters in between. Similar expansion has occurred in other States and under favourable propagation conditions, Queensland, Victoria and South Australia have been connected with New South Wales on 144 MHz via chains of digipeaters.

On HF there is no limit to the distances which can be covered. There have been problems associated with packet radio operations on 14 MHz due to the problem of finding "space" there. However, other HF bands are now being used with dual frequency modems making this simple and convenient.

As with the creation of the world, when order eventually emerged from chaos, it is hoped and expected that the same thing will occur with packet radio but much more rapidly! Just as Gentlemen's Agreements have been adopted for other amateur operating modes, it is to be hoped that packet operators will adopt some form of self-discipline to improve the situation on the popular VHF packet frequencies. There would appear to be no need for more than two Bulletin Boards to share the same VHF frequency in a particular area. Operators who persist in down-loading long files, messages and listings during peak operating periods are quite entitled to do so but they must expect to lose friends and annoy people — particularly if it is suspected that they have the opportunity of doing so at slack periods.

Meanwhile many of the congestion problems on 144 MHz will be overcome by the introduction of UHF "data highways" connecting Local Area Nets (LAN). Other techniques can be introduced to avoid most of the problems which arise from the need to use multi-station digipeating for long distance connects on VHF.

AAPRA is playing an active part in introducing these techniques, but unfortunately it all takes time. Much work and effort is needed to test digipeater sites obtain site approvals and licences as well as to prepare and install packet equipment and antennas. Local radio clubs and individuals do much of the site work but AAPRA Committee members are kept busy in a supporting and co-ordinating role.

Another AAPRA activity has involved the supply of kits and software for the XR modem to run on the Commodore series of computers. A number of amateurs, both in Australia and overseas, have taken advantage of this. Improved models of the modem to suit not only the Commodore, but also other popular personal computers are being developed.

The Association publishes a regular newsletter *Digipeat* and is expanding it's membership quite rapidly which is most encouraging in it's efforts to promote and co-ordinate the development of Packet Radio in Australia.

ar

REMEMBER

When inquiring about products published in AR, always mention where you read of the product!

Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

AWARDS ISSUED IN NOVEMBER AND DECEMBER

WAVKCA (VHF) 52 MHz
29 VK2JEW
30 Peter Cosway VK3DU

WAS (VHF) 52 MHz
174 VK2JEW

WAVKCA
1561 Findlay Baxter GM3VEY
1562 Yuki Hishino JJ1KUV

DXCC
Phone
361 W J Matthews VK3WJ

CW
131 Ian C Fisher VK4FB

UPDATES
VK2AKP 281/283 ph, 281/283 op
VK2PU 183 ph
VK3DP 199 op
VK3DU 285/290 ph
VK4LC 308/343 ph
VK5WO 201/208 CW

FIELD AWARD
The Swedish Amateur Radio Society will issue the Field Award diploma to licenced radio amateurs and shortwave listeners for verified contacts with *fields*, as defined by the locator system adopted as from January 1 1985, (Maidenhead locator). Contacts on or later than this date are valid for the diploma.

The Field Award is issued in four classes:

BRONZE (basic award)	100 fields verified
SILVER (sticker)	200 fields verified
GOLD (sticker)	300 fields verified
PLATINUM (sticker)	All 324 fields verified

All amateur radio bands and modes are permitted. Endorsements will not be issued.

All contacts shall be made with stations on the surface of the earth.

Contacts shall be verified by QSL cards or their equivalent, on which the field or position is clearly stated with such accuracy that the field can be determined. The term "position" refers to latitude and longitude or to a place name.

If there is any uncertainty about a field, SSA may demand further information before approving the contact. If the uncertainty remains, then the contact will not be approved.

A random sample of individual QSL cards will be made, which must be sent in for checking.

The application shall be made on a GCR list. containing the information from each QSL card which is required for approval. The GCR list shall be verified by the applicant's national diploma manager or other official in the applicant's national amateur radio society.

The fee is SEK 30, 10 IRCs or US$4.

Application address is: Field Award Manager, SSA, Ostmarksgatan 43, S-123 42 Farsta, Sweden.

A world atlas, showing the new locator grid, has been produced by SM5AGM, which can normally be purchased from every National Amateur Radio Society.

The atlas can also be ordered from SSA by sending a SAE and six IRCs.

A record book for this award can also be obtained for $2 or five IRCs.

SCANDINAVIAN CW ACTIVITY GROUP
To support and encourage amateur radio CW

WORKED SCANDINAVIA ON CW: This new award with a beautiful Scandinavian landscape is issued in a limited number (500) by the Scandinavian CW Activity Group (SCAG), on the occasion of its 10th jubilee.

To qualify, non-European stations are required to work 50 different Scandinavian CW stations including LA, OH, OY, OZ, SM and TF. Of these, at least five should be SCAG members.

Only contacts after January 1, 1988, are valid. No contest contacts will be permitted.

Application lists should be confirmed by two other licenced amateurs and show calls worked, date, time (UTC), band, QTH, name and SCAG membership numbers (ask for this during the QSO — no QSL cards are required).

The awards manager will check the lists and the first 500 applicants will receive their award by air mail. Upon receipt, please send the fee, US$7 or 17 IRCs.

Postal address is R Meilstrup OZ5RM, Bavnestien 6, DK-2850, Denmark.

WORKED BERLIN WEST AWARD (WBW)

To encourage the activity of amateur radio stations in the Berlin West area, the Ortsverband Schoeneberg DOK DO5 of the DARC is issuing the Worked Berlin West (WBW) Diploma.

The WBW is available to all licensed radio amateur stations (and SWLs on a 'heard' basis) fulfilling the following conditions:
Count confirmed QSOs with licensed radio amateurs working from the different 'Postal Delivery Districts' (PDD) of Berlin West. The PDD is a two-digit number following the name of the city of Berlin as apart from the address printed on the QSL card. For example: D — 1000 Berlin **37** denotes the PDD 37.

The WBW is issued in two categories:
GENERAL — QSOs in all allowed classes of emission
2 x CW — All QSOs in two-way CW

The WBW is issued in three classes:
CLASS C (Champion) — 30 PDDs confirmed
CLASS S (Senior) — 20 PDDs confirmed
CLASS J (Junior) — 10 PDDs confirmed

All QSOs after January 1, 1970 are valid for the WBW. No charges will be made for the WBW Class Champion in either Category, but a fee for the WBW in either Category is DM 5 or five IRCs. Stickers are available for all Classes in the same Category. For the first application the sticker will not be charged, for later applications the fee for the stickers will be DM 1 or one IRC. For Class Champion, the sticker will be free of charge. Send no QSL cards. A GCR list should be submitted, certified by two other licensed amateurs, signed by the applicant, and containing data about call, date, GTR, class of emission and PDD. The GCR list and fee should be sent to the WBW Award Manager, Detlef G Liebe DH7ACG, Zinnowweg 4, D-1000 Berlin 37, West Germany FRG.

REPEATERS & BEACONS

Tim Mills VK2ZTM
FTAC BEACON CO-ORDINATOR

A six metre repeater has become operational in VK2. Installed by the Newcastle UHF and ATV Group. VK2RSN will be on channel 3625 (53.625 MHz). It will use a minus 1 MHz offset. The area served is the Newcastle/Hunter Region. The other VK2 system is on channel 3850, as yet not be completed, will serve Sydney from VK2RWI.

It should be noted that two offsets are currently in use with six metre repeaters. The original band plan was based on a 600 kHz offset but this was amended a couple of years ago when the world chose 1 MHz. Systems with 600 offset will change in due course. That decision rests with the system controllers. Repeater outputs are between 53.600 and 53.975 MHz. Inputs are between 52.600 and 53.375 MHz, depending on the offset. The existing band plan has 16 channels with two per call area on a single use basis. The problem has arisen where a call area requires more than two systems. If suitable geographical and skip spacing occurs within the same call area it may be practical to re-use the same channel. The alternative is to use channels with the best skip isolation and put up with the co-channel interference that may occur during band openings. Commercial systems (repeaters) now operate at 40 MHz with quite close geographical separation with suitable tone access.

FTAC will continue to investigate the six metre planning.

Two metre repeater, VK2RDX 6650, in the Western Blue Mountains is out of service while its host support tower is replaced due to its age.

Has your repeater group found any corrections/additions to the list in January AR? If so, please send them to FTAC at the Federal Office.

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VK4 WIA Notes

Bud Pounsett VK4QY
Box 638, GPO, Brisbane, Qld. 4001

Jim VK4ZML and Bob VK4BAW (at the keyboard), in a determined effort during the 1987 RD Contest. The location was at VK4AHO's shack, Brisbane, and the call sign was VK4WIZ, of the Radio Amateurs Group.

The Host and Chef, David VK4NLV.

Left Top:

At a Christmas Barbeque for VK4 councillors and helpers, From left: Murray Kelly VK4AOK, Brian Rickaby VK4RK, Theo Marks VK4MU, John Aarsse VK4QA, Bud Pounsett VK4QY, Guy Minter VK4ZXZ, Val Rickaby VK4VR, Harry Standfast VK4ASF, Ann Minter VK4ANN, Ross Mutzelburg VK4IY, David Jerome VK4YAN and David Jones VK4NLV.

Centre:

Four 1987 Councillors: Bud VK4QY, John VK4QA, Theo VK4MU and Harry VK4ASF.

Left:

Three of the VK4WIA News Team: Theo VK4MU, (the 20 metre relay operator), John VK4QA (a major contributor to the news) with Bonnie VK4WIA News Reader.

VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW. 2150

COUNCIL NOMINATIONS

A reminder to members that nominations for the Council of 1988/89 close at the registered office of the Division, 109 Wigram Street, Parramatta, at 2 pm on Tuesday, March 15, 1988. Nomination forms are available from the office or in the form prescribed in the Articles. Agenda items for the Annual General Meeting close at the same time. The AGM is set down for Saturday, April 30, 1988, at 109 Wigram Street, Parramatta, NSW, starting at 2 pm.

VK2 AWARDS

Details of the various awards introduced into VK2 have been given on the recent Divisional Broadcasts. Details will be published in the Awards Column of AR and elsewhere or leaflets are available at the Divisional Office. Send a self addressed stamped 230 x 110 envelope to PO Box 1066, Parramatta, NSW. 2150, for copies.

FORUMS

It is planned to conduct three or four forums at Amateur Radio House during 1988. If you have a subject you would like discussed or a lecture given on, please advise the Council via the office.

CONFERENCE OF CLUBS

This will be held on Saturday, April 16, and if the business requires it, it will continue on Sunday, April 17. Host will be the Fishers Ghost ARC. Close of club agenda items must reach the Divisional Office by the beginning of March. Any agenda items for the Federal Convention must also be received at the office by Friday, March 11. (The Federal Convention will be held in Melbourne over the weekend April 23/25).

Trash and Treasure in the Parramatta car park — 2 pm on Sunday, March 27. The Postcode Contest for this month will be on Friday, March 9, to 11 pm. Logs must be received by April 6. Further details are on the AX2WI Broadcast.

BAND OPENINGS ACROSS THE TASMAN

During January there were several openings to New Zealand. Around January 13/14, the opening extended up to at least 1296 MHz. At the time these notes were prepared, at least Dick VK2BDN and Ross VK2ZRU, had worked Brian ZL1AVZ on 23 cm. The VK2RSY 1296.420 MHz beacon was also heard by ZL1AVZ.

VK2AWI BBS

A digipeater is to be installed at Dural to provide a better service area. VK2AWI operates on Channel 4850, which is shared with VK2 WICEN.

PARRAMATTA BICENTENARY

Celebrations will be observed during November and the Division will be mounting a station to work from the various historic sites within Parramatta City. Aub VK2AXT, is co-ordinating the operation.

WICEN

This month there are several operations. The Bungonia Cave rescue exercise is on the 12/13. The car rally, refer to January AR and Taree WICEN has the Great Lakes Triathlon at the end of the month. Incorporation for WICEN is still proceeding slowly.

BLANK QSL CARDS

A new range of blank QSL cards are available for purchase from the Divisional Office. They have been redesigned to include the Bicentenary logo.

ADVANCE PUBLICITY

If your club or group is holding a field day or some other event and you require publicity in AR, then do not forget the lead times. Send your material to Club Corner. If required in the May issue copy should be at the Federal Office by March 20. (Deadlines are always listed below the index on page 1 and at the beginning of Hamads of each issue of AR).

NEW MEMBERS

A warm welcome is extended to the following new members who were in the January intake.

B J Barton VK2MDV	Fishermans Paradise
E L Collett VK2FGC	Coal Point
T M Craig VK2FHF	Glebe
L K Fanning VK2DOJ	Greenwich
R J Freedman VK2MCU	Merewether
L T I Hansson Assoc	Turramurra
D E Havinden Assoc	Belrose
O L Holmwood VK2AEJ	North Sydney
K H Miller VK2XKM	Kotaea South
C Mlynarik VK2CMK	West Pymble
E N Napper VK2VMP/FIN	Emerald Beach
C F Needham VK2XGV	Mount Pritchard
P Ofner Assoc	Mosman
V N Stafford Assoc	Copacabana
D J Wade VK2XIT	Penrith
R C Wallace VK2XFR	Warringah Mall

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WA Bulletin

Fred Parsonage
VK6 HONORARY SECRETARY
PO Box 10, West Perth, WA. 6005

NOTICE OF AGM

It is hereby notified that the Annual General Meeting of the Western Australian Division of the Wireless Institute of Australia will be held on April 19, 1988, following the General Meeting, which commences at 2000. The meeting will be held at the Westrail Centre, West Perth.

AGENDA

1. Consideration of the Council's Annual Report.
2. Consideration of the Financial Report.
3. Consideration of other reports.
4. Election of office bearers, viz: President and Vice-President of the Division and seven other councillors.
5. Election of two auditors.
6. Appointment of a patron.
7. General business which has been duly notified.

Notices of motion for the AGM must be received by the Secretary not less than 42 days prior to the meeting and must be signed by at least three members.

Nomination of a candidate for election to Council must be received by the Secretary in writing not less than 42 days prior to the meeting with an intimation that such candidates are willing to act. A candidate may submit a statement not exceeding 200 words outlining his or her case for election and experience. Each nomination shall be signed by two members proposing the candidate. Candidates must possess a current amateur licence.

PROXIES

Any financial member entitled to vote may appoint a proxy, who must also be a financial member entitled to vote, to speak and vote on his/her behalf. Each such proxy must be in the hands of the Secretary prior to the meeting and be in the following form:

I, ... a member of the Institute hereby appoint . . . . . also a member of the Institute to act for me as my proxy and in my name to do all things which I myself being present could do at the meeting of the Institute held on . ./. ./. . . .
Signed: .....

Witness: .....
Date: .....

GENERAL MEETINGS

All members please note that General Meetings of the Division are held on the third Tuesday of each month in the Westrail Centre, East Perth.

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QSP

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REDUCE QSL CARD COSTS
Can we do it in VK?

As QSL cards become more expensive every time you purchase them, wouldn't you like to be able to make your own and eliminate the need to purchase expensive printed cards.

This may not be as difficult as it sounds . . . Several hobby shops in Canada are now marketing a Do-It-Yourself, silk screening kit which is especially made for posters, greeting cards, and QSL cards. You design the artwork, sensitise a piece of silk stretched across a wooden frame, with a liquid supplied, place your artwork over this silk and expose to light.

Then dip the silk and frame in solvent and you get a negative of our artwork. With a sponge ink is then forces through the silk onto your cardboard blank — and there you have a distinctive QSL card for a fraction the cost of a commercially printed card.

—Contributed by SEQTG RTTY News Bulletin

QRM from VK7!

John Rogers VK7JK
VK7 BROADCAST OFFICER
1 Darville Court, Blackman's Bay, Hobart, Tas. 7052

The first part of this month's QRM has a decidedly nautical flavour because, just as this was being written, one group of amateurs have been discussing the outcome of the radio communications support they provided to the Westcoaster Melbourne to Hobart Yacht Race. This appeared to have been a very successful service and congratulation were forthcoming from the Commodore of each yacht club involved and from the skipper of one of the participating yachts.

There were 18 amateur operators fully taken up with the communications system, and although they were based at the Derwent Sailing Squadron Headquarters, in Hobart, they were drawn from all over the State. Not only were they concerned with the safety and positioning contacts, but with ATV coverage, information displays (on VDU), and computerised graphics to keep everyone (including the media) up to date. If it is deemed necessary, we hope to repeat the exercise next year. In the meantime, any amateur wishing to prepare for that task, and wanting to obtain a Restricted Maritime Operator's Certificate, should contact the co-ordinator of the local branch for a Study Guide Book.

The second point with a nautical emphasis is that of the Tall Ships Event which took Hobart completely under its spell for the duration of its stay. Not only the professional broadcasters were talking about it day and night, but the amateur airwaves were full of it too. Anyone who had access to a boat was out on the water — the number of MMs was quite phenomenal! A never to be forgotten episode, even for those who turn green at the thought of being water-borne.

The International Orienteering Exercise was covered by the southern WICEN group last January and it gave us the chance to put into serious practice the lessons we had learned in earlier "dummy runs".

The Bicentenary Vintage Car Rally was due to thread its way through Devonport on March 10 and 11, and traffic for this event has to be passed back to WICEN Headquarters in Canberra, so it is clear that involvement in these communication support activities is becoming more and more frequent, and thus needs more and more participants. Your local co-ordinator would appreciate an offer from you of some form of active support. Short instruction sessions are included in most weekly broadcasts.

WIA MEETINGS IN MARCH

IN THE NORTH-WEST: at the Penguin High School, at 8 pm, Tuesday, March 8.
IN THE NORTH: at the Launceston Maritime College, at 7.30 pm, Friday, March 11.
IN THE SOUTH: at the Activity Centre, 105 Newtown Road, Hobart, at 8.15 m, Wednesday, March 2.

Please do not forget the Divisional AGM to be held on March 19, at Rutherglen, at 1400 hours.

Interested parties should now be keeping a watch on the 145.825 MHz frequency of the Nordskicomm Ski Trek across the North Pole from Russia to Canada.

The new broadcast roster is now in use and will last through to the end of May. A total of 30 amateurs is now involved, which means that the load on any one operator is much reduced. Five relay frequencies are used each Sunday morning, and the broadcast is repeated on 3.590 MHz only on Tuesdays at 1930 local time. No call-backs are taken to this repeat because, on completion, it transfers directly on to the Devil Net with Bob VK7NBF. However, reports have been received from VK1, VK2 and VK3 of good signals, so the experiment appears to be working successfully. Information on the actual frequencies has been published elsewhere in AR.

You may remember that last month, we mentioned that the southern area is to be responsible for the 1988 Tasmanian Amateur Radio Convention. Well, this is the month in which the TARC Committee is to present its planning brief, and from here on, right through to the Bicentennial TARC itself, action, not talk, will be the order of the day. A detailed update will be forthcoming in next month's AR.

WICEN (South) Co-ordinator, Alan VK7CI says: "The recent outbreak of bushfires in the south of the island must serve as a timely reminder that this form of natural disaster is still the most likely to threaten our population centres during the summer months. With this thought in mind, urgent attention has been given to finalising the call-out procedure for the Southern Group." As a result of the experience gained in the exercises conducted during the past two years, this group has been divided into four sections:

1. Headquarters section: Base stations and the link to SES. Also responsible for setting up a roster of relief operators.
2. Satellite section: Mobiles with HF and VHF capability. Self-sufficient in power, rations and accommodation for several days. These vehicles would be the first WICEN units in the field and would establish early contact with the Base Stations.
3. VHF mobiles: Vehicles to operate in advanced positions and communicate with Base Stations via satellite units if necessary. The outstanding feature of this section is its mobility.
4. VHF special section: Has the expertise to set up special VHF links and repeaters where necessary and to meet unusual communication needs in the case of a protracted emergency.

Each section has a co-ordinator responsible for its mobilisation. In the meantime, let us keep our batteries charged, our equipment in a good state of serviceability and our fingers crossed in the hope that it will not happen.

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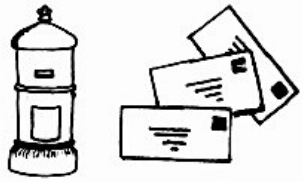
Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

Over to You!



CORRECTION

I was reading the discussion paper by John Anderson VK5ZFO, with some interest until I choked on the phrase, "The USA amateurs have just lost two megahertz of their 220 MHz band . . ."

I would like to inform the WIA membership that this statement is most emphatically **not** correct. We have not, as of this date, lost anything at 220 MHz, nor do we intend to do without exhausting every available avenue for its defence.

This in no way detracts from the point John was trying to make; indeed, the reason we have been able to mount a rigorous and, I believe, an ultimately successful defence of the band is because we have a strong national organisation, and a large body of members willing to respond when their help is needed on an important issue.

Collaborating with VK amateurs has been among the bright spots in my amateur radio career. From this experience, I'm confident that the WIA will emerge from its self-analysis with even greater vigour than before.

73,

Sincerely,

David Sumner K1ZZ
Executive Vice-President
The American Radio Relay League, Inc
Newington, Connecticut, USA. 06111

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FEW TRICKS

Many thanks for the excellent presentation, in the January 1988 issue of AR, of my article about the two metre beam tilting device.

Unfortunately, the Printer's Devil has played a few tricks, some of which might warrant a correction:

1. "was" has been inserted between "vice-versa" and "most" at the end of Para 2 — does not make sense.
2. In Para 4 the capacitors are stated to be in the -ve line. They should be in the +ve line — where they obviously belong.
3. In Para 7 there should have been a "the" between "to" and "exact".
4. In Figure 2 a line connecting pins 4 and 8 of the 555 has been added — there was one already, and now there are two!
5. In the Appendix, line 3, the α is missing from cos α.
6. In Para 3 of the Appendix it says "La must be two times Lm". This should be $\sqrt{2}$.
7. In the next line the square-root line should not be over the entire equation but only the 2.

In the Appendix, Table 1, the figures for B for the angles 150° and 165° should read 10° less, ie 82.76 and 88.08 respectively.

However, I appreciate the generous space given my article and the, as usual, excellent reproduction of the drawings.

Yours sincerely, with 73

George Cranby VK3GI
PO Box 22
Woodend, Vic. 3442

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STAY WITHIN. . .

With reference to the letter by Arthur Oliver VK6ART, in the December issue of AR, the Band Plan mentioned does, in fact, not permit Packet Radio above 14.100 MHz. For a long, long time the RTTY operators have respected the use of *their* part of the band; ie 14.070 to 14.099 MHz, and the CW and SSB users have likewise not invaded that area. Within the past month it has become patently obvious that packet operators are intent on spreading themselves over a much larger portion of 14 MHz. Stations have been heard operating from 14.052 to 14.125 MHz with no respect for frequencies already in use.

The once sacrosanct frequency of 14.100 MHz is now, for much of the time, useless for the monitoring of beacons.

The Traveller's Net, run by Art, has been providing an important link with amateurs in remote areas of the country and with maritime mobile stations in the Indian, Pacific and Arafura Oceans, and has, on countless occasions, given emergency aid to people who may, otherwise, not be around to tell the tale! The frequency 14.106 MHz is known world-wide by all who travel and has been respected by *all* other amateurs — until now.

Packet radio has its place just as much as any other mode, but it, like SSB, CW and RTTY, etc, should abide by international allocations and stay within the area set aside for narrow band transmissions.

Yours faithfully,

Barry Clarke VK5BS
17 Sycamore Avenue
Novar Gardens, SA. 5040

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CONTEST

If there has been a lot of thought put into the 1987-88 Ross Hull Contest format and rules, as implied by the new contest manager, one must seriously question the quality of that thought.

Sure, the format and rules are markedly different from those in the past but mere change was not what was required. It has to make sense. This lot doesn't even come close to that goal. Let us look at a few of the minor anomalies:

1. In some cases, eg Melbourne, the border between the Maidenhead squares run through the city thus permitting stations located there to collect up to 3 x 22 = 66 points per station pair for working over their back fence. This is supposed to even things up across the whole country?
2. Suppose a station in QF56 can work several stations in QF21 on a particular band but a particular station in QF21 can only work that one station in QF56. A very common situation on the two metre band. Suppose further that, during the contest, the QF56 station has worked several in QF21, but not that particular one in question, until on the last day both have notched up the same number of points.

On this day the QF56 station hears the QF21 station calling CQ and knows that a contact is possible. Does he answer? Not if he has his wits about him. That contact would only be worth one point to him but it would be worth 51 points to the QF21 fellow, wouldn't it? What are we playing? Amateur radio or Strategy? Surely it is a fundamental rule that a contact must be worth the same points to both parties at all times.

3. Contacts via repeaters are not permitted. Makes sense maybe, but contacts via satellites are permitted. What is the difference? Are we having a contest or seeking to satisfy someone's idea of what should or should not be encouraged this year? Perhaps next year someone will decide to encourage the use of quad antennas over Yagis and so contacts between stations so equipped will be worth more points. Surely we must decide just what precisely is the object of the exercise and stick to it. The object certainly is not to encourage this or that group of your mates this time around.

The fundamental thing wrong with the Ross Hull Contest is that it is ***too long*** and following from this comes the realisation that it is held at the wrong time of the year. It is ***not*** a VHF/UHF contest's bootlace! The essence of VHF/UHF competition is distance worked without assistance from outside influences and, until such time as that fundamental fact is recognised and catered for, the Ross Hull Contest will continue to go downhill. Come to think of it, that is also the essence of amateur radio as a whole and the same prediction applies in that wider sense also.

73,

Gordon McDonald VK2ZAB
59 Wideview Road
Berowra Heights, NSW. 2082

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AMATEUR RADIO? YOU MUST BE JOKING!

As I recall, the current debate on the future of amateur radio started when someone came up with the statistical evidence that indicated that amateur radio ranks were not being filled at the same rate as the increase in population as a whole and that, seen from this aspect, amateur radio was declining in popularity as a hobby.

Since that time we have witnessed the publication of umpteen letters and articles telling us how to rectify the situation or else questioning whether or not it needs rectification.

All of these suggestions have come from amateurs or near-amateurs and it seems to me that these people are not really in a position to know much about the best way to change the situation.

If you were going to try to market something you would not rely on the opinions of your immediate family as to whether or not this or that feature of the product would sell, would you? Of course not; you would do a market survey to try to determine what features prospective buyers wanted so that you may be able to fill those requirements, increase sales and maximise profits. Elementary!

We are trying to market amateur radio as a hobby so instead of forming committees to incestuously pontificate about it we should be trying to determine why those groups of people who have traditionally supplied recruits to amateur radio are not doing it any more. We can so this be asking them.

One such group of people are those who are already associated with radio and/or electronics, either as hobbyists or because they work in the industry, or both. I know that these people do not become amateurs at anywhere near the rate that they did in the past because I have read the findings of surveys conducted among RF engineers in the USA and because I work at AWA where amateurs were once "thick on the ground" and where they are now as "scarce as hen's teeth." There is also other evidence which I can supply to anyone who is interested, however I would be surprised if anyone doubted that these people are largely giving amateur radio a miss.

Over the past few years I have asked many people where I work and in components stores, both here and in the USA, why they don't take out a licence and get on the air.

The reasons given are varied, of course, but the general theme is that amateur radio is seen to be somewhat out of touch with the latest technology and that amateurs are quaint old fellows locked away in shacks playing with Morse keys. Who would want to be associated with them? Sure, it may be interesting to get on the air and make contact with people around the world whilst conducting experiments, but in order to do that you have to learn Morse code. You have to be joking, we are not that interested.

Contrary to the idea expressed by many amateurs, Morse code is not seen as an interesting

challenge at all. It is seen as a demeaning chore imposed on prospective acolytes so that they may gain access to the inner sanctum and thereby associate with . . .'er . . .'er . . .what? It is like the condition imposed on the ambassador of a major power that he must enter the throne room of some irrelevant petty despot through a low opening so that he will arrive in the exalted presence in a suitably cowed attitude. No one with grit would consider it.

There is absolutely no doubt that the continued retention of the compulsory Morse code requirement is the main reason why amateur radio is seen to be an anachronism of no relevance to present day radio enthusiasts and the main reason why those people do not become amateurs.

The compulsory Morse requirement should be discontinued immediately, not after 1992. It would not come as a surprise to me to find that a survey of other groups of prospective amateurs indicated the same thing. Over to you!

73,

Gordon McDonald VK2ZAB
59 Wideview Road
Berowra Heights, NSW. 2082

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WIA HANDBOOK

After reading the Editorial in the November 1987 issue of *Amateur Radio*, I offer a late suggestion for an Australian Radio Amateur Handbook based on the style of the DIY Pro-File series of magazines on sale through newsagents at the moment. It would require an alteration to the size or layout of AR by way of a wider margin on the binder side of the pages and a series of holes punched down that edge.

I agree that an Australian Handbook is needed and should be published. I feel that by changing AR we can have the best of both worlds at a sensible price. You only have to look at recent issues of AR to realise what a wealth of information is included in every issue; VHF/UHF Building Blocks, Safety Around the Shack, and the EMC Report are only examples from one issue.

If all of this could be easily filed in one or more good quality binders, then it would only take several years to build up a comprehensive, up-to-date, perpetual handbook rather than have the situation of buying a book today and have a new version (at great cost) hit the news-stands in 12 months time.

Following are requirements for implementation:

* change the size or layout of AR
* wide margin down binder edge
* filing holes punched into binder edge
* second page numbering system; ie section, page number, version/issue to suit handbook
* possibly a loose leaf style with plastic binding as on the DIY Pro-File series or even stapled
* change layout of AR, so articles start on odd-numbered pages only
* use non-handbook items, or relevant fillers, to fill pages and not mix items from different sections of the handbook, particularly on the even-numbered pages
* provide binders and section separators for handbook (at extra cost)
* provide an annual index that covers many years and is fully cross-referenced (separate section in handbook)

Advantages are:

* no or minimal cost penalty to the WIA
* very little extra cost to members
* no duplication of articles/effort between AR and the handbook
* an Australian handbook which is easily updated/amended and which is relevant

Disadvantages are:

* it could take several years to build up a worthwhile handbook
* AR as we know it will disappear to become a monthly series of handbook articles

I cannot comment on costing to implement the necessary changes to AR to achieve this proposed handbook, but feel very little would be involved. After all, the main changes required are in layout and the choice of filler articles. The only question mark is the widening of the binder margin and the provision of filing holes and I do not know what is possible or required here.

I too am waiting for the arrival of an Australian handbook and have set up a file of articles similar to my proposal outlined above but using A4 sized "refillable display books". These are available in several colours from several manufactures and contain 20 clear pockets with refills of 10 pockets also available. It requires that I cut up each issue of AR and even photocopy some pages and then file them. A list of contents has been worked out to suit the binders and work will have to be done on writing out a cross-referenced index based on the annual index from AR.

This method suits me at this stage as it also allows the filing of articles from other sources as well but cannot hope to replace a well indexed, planned handbook. It is more than likely that the ideas outlined above have already been expounded and considered by the WIA, but I offer them for what they are worth. In the meantime I will continue with my temporary handbook! Thanks to all concerned for all the great articles so far, keep up the good work and don't drop your standards. I am prepared, and indeed expect, to pay more for quality.

For interest, this is the the layout of my temporary handbook:

1. (Green) — Principles; components; interference; operating techniques
2. (Black) — Modulation systems; RTTY; SSB; propagation; packet
3. (Maroon) — Power; safety; regulations
4. (Brown) — HF equipment; VHF; UHF; TV; mobile
5. (Yellow) — Test equipment; measurements; station layout; workshop practices
6. (Blue) — Aerials; transmission lines; data and tables; index.

The list is always subject to change and each binder has its own expanded contents list. I hope the above may be of some assistance.

Yours sincerely,

Colin Hay VK2ZHC
6 Noamunga Street
Boat Harbour, via Anna Bay, NSW. 2301

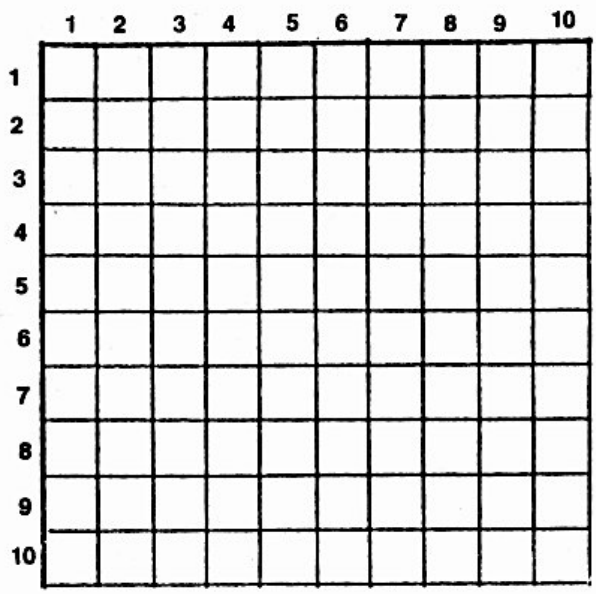
ar

MORSEWORD© 13

Compiled by Audrey Ryan

30 Starling Street, Montmorency, Vic. 3094

ACROSS		DOWN	
1	Verse		
		1	Magician's Rod
2	Throw off	2	Powder
3	Dog	3	Change position
4	Ward off	4	Skin
5	Review (abbr)	5	Strap
6	Innards	6	Mouth (colloq)
7	Type of sauce	7	Prison
8	Melt	8	Sight
9	Blaze	9	What cows chew
10	Sudden attack	10	Combine



Solution see page 63. . .

Silent Key

It is with deep regret we record the passing of:

MR I A R POLSON VK5UT

Obituaries

LEO S MEYERS VK2KS

Well-known and longstanding member of the amateur fraternity, Leo VK2KS, passed away on December 15, 1987, after a short illness.

Leo was licensed as VK2KS on January 2, 1935, and became an active DXer on both CW and 'fone. His call sign became well-known throughout the amateur world. A member of the WIA from those early days, Leo retained his interest in the Institute's activities and remained a member through the years.

As a fellow member of the old Lakemba Radio Club, the writer, along with other prospective amateurs of the day, was introduced to the practicalities of amateur radio, particularly by Leo.

At the outbreak of war in 1939, Leo, who had been an active member of the RAN Reserve, was soon on active service with the Royal Navy. He served in the Navy from 1939 until 1946, initially in the Atlantic zone and later with the RAN Naval Commandos in the Western Pacific, serving at such places as Morotai and taking part in the D-Day Landings at Tarakan (where our paths again crossed) and Balik Papan.

Apprenticed as an Electrical Mechanic to the New South Wales Railways in pre-war days, he resumed his career in that service after his discharge from the Navy. At the time of his retirement some nine years ago, Leo had advanced to the position of Telecommunication Design Engineer and had been responsible for many innovations in two-way radio communications and the application of microwave links and various electronic facilities within the NSW Railway system.

In their retirement to the Blue Mountains, Leo and his wife, Sybil, lived in close proximity to their daughter, son-in-law, and grandchildren. Here, while building a fine garden around their new home, Leo maintained an active interest in VHF and HF amateur operation, including CW.

Sincere condolences are extended to Leo's wife Sybil, daughter Karyl-Lee, son-in-law Alex, grandchildren Damien and Larissa, and brothers Frank and Bernie.

Keith Sherlock VK2WQ
ar

RAYMOND JOHN FOXWELL VK5ZEF

Some six months have passed since the untimely passing of Raymond John Foxwell VK5ZEF, Amateur Television Operator and publisher of *The ATVer*. Whilst the following does not claim to be definite, I wish to put on record something about the contribution that Ray made to the Australian amateur television fraternity.

My first encounter with Ray was upon my return to the VK5 ATV scene in 1974 after an absence of some six years. During that time Ray had become the undisputed mentor of the (as yet informal) SA ATV Group which consisted of a handful of ATV experimenters on what was then the new 70 cm amateur band.

In the years that followed, I got to know Ray as a colleague, a man with the common touch, and one who was always ready with an offer to help a fellow ATVer. There was never enough hours in the day for Ray, not in the sense of his being in a hurry, but that he always had more plans afoot (both of his own and to help others) than any mortal could possible hope to accomplish. Indeed, he often used to joke that his middle name should have been "Gunner" because he was always "gunner do this, that or the other"!

Ray was very self-sufficient; he would tackle all of his projects single-handedly from go to whoa. For instance, he established his own printed circuit board manufacturing facility; for *The ATVer* he acquired a photocopier and duplicator and carried out all the writing, editing, layout, printing, collating and posting himself. He designed and laid out both RF and Video ATV circuit projects and he made his printed circuit boards available, to whoever wanted them, for next to nothing.

Over the years, Ray made significant contributions to the first Australian ATV Repeater, VK5RTV, by way of receiver preamplifiers, converters, IF strips, and antennas. And, I think it quite likely that there would scarcely be a VK5 ATVer who has not been materially assisted by Ray over the years. And by means of *The ATVer* even ATVers outside South Australia were served as well.

I must confess that, at times, I felt frustration waiting for a promised PC board, or the next edition of *The ATVer* to come out, but the delay would invariably be because of the impossible load that Ray had set himself. Indeed, if Ray had a fault, it was that he just could not say "No" to anyone who asked of his time!

ATV was the richer because of Ray Foxwell VK5ZEF, and it has been made the poorer by his passing. His name will be remembered as long as one of his ATV circuits is still in use, and that will be a very long time!

John Ingham VK5KG
for the SA ATV Group
ar

CHITARY MORIYAMA JH6THP

All who met Chitary, either in person or on the air, will be saddened to learn that he died last December.

Chitary became interested in amateur radio soon after being to the Kawatana National Hospital. He was suffering from progressive muscular dystrophy and the disease was so far advanced that he was unable to walk, had no use of his arms and his life expectancy was very limited. Despite these severe handicaps, Chitary studied for the licence which he obtained in 1974 and began operating on 15 metres sideband using a rotary beam, tower and transceiver installed by local amateurs. In 1978, he graduated to a higher grade of licence which enabled him to use 20 metres and higher power. With his cheerful manner and excellent idiomatic English he made many friends. Several VK amateurs who visited Chitary at the hospital near Nagasaki found the experience deeply moving.

He founded the hospital club station, JA6ZCY, and the Pacific Amateur Radio Society.

Arising from his many contacts with Australian amateurs Chitary became very interested in visiting this country. His dream was realised in 1981 with the assistance of the Australia-Japan Foundation and Rotary International of Japan during the Year of the Disabled. Ably supported and tended by his brother, Mashio, he visited Sydney, Canberra and Melbourne and enjoyed sightseeing, attending club functions and visiting private homes.

Chitary was the subject of AR articles in 1977, 1981 and 1982.

Perhaps it was because of his indomitable spirit and keen interests Chitary's lifespan of 37 years was a little longer than most PMD sufferers reach.

Sayonara Chitary. You were a fine ambassador for your country and for amateur radio and an inspiration to all who met you.

Alan Elliott VK3AL
ar

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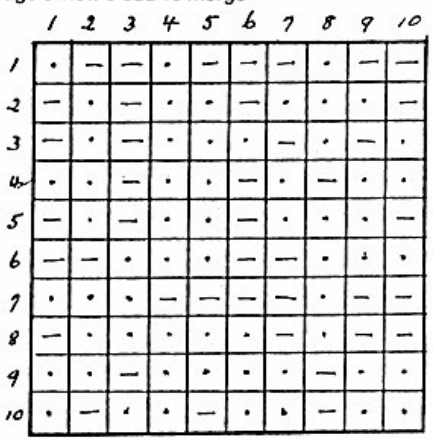
ar

SOLUTION TO MORSEWORD© 13

Across: 1 poem 2 cast 3 cur 4 fend 5 crit 6 guts 7 soy 8 thaw 9 fire 10 raid.

Down: 1 wand 2 dust 3 move 4 hide 5 belt 6 gob 7 cage 8 view 9 cud 10 merge



DEADLINE

All copy for inclusion in the **May 1988** issue of *Amateur Radio*, including regular columns and Hamads, must arrive at **PO Box 300, Caulfield South, Vic. 3162**, at the latest, by **9 am, March 21, 1988.**

Hamads

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write ***each*** on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. ***Please do not use scraps of paper.***

- Please remember your STD code with telephone numbers
- Eight lines free to all WIA members. $9.00 per 10 words minimum for non-members
- Copy in typescript, or block letters — double-spaced to ***Box 300, Caulfield South, Vic. 3162***
- Repeats may be charged at full rates
- QTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:
$22.50 for four lines, plus $2.00 per line (or part thereof)
Minimum charge — $22.50 pre-payable

Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105 x 220 mm SASE to: **RJ & US IMPORTS,** Box 157, Mortdale, NSW. 2223. (No inquiries at office please . . . 11 Macken Street, Oatley). Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albury, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza. ACT.

COMPONENTS: Wide range of parts for receiver, transmitter and other electronic equipment. Semiconductors, valve, plate bypass capacitors, coaxial connectors and many more. Mail inquiries welcome. Sorry, no catalogue available. D Dauner Electronic Sales, 51 Georges Crescent, Georges Hall, NSW. 2198. Telephone: (02) 724 6982.

WANTED — ACT

KENWOOD AT-230 ANTENNA TUNER: (consider AT-250 or AT-130). FM-430 FM board, YK-88C or YK-88CN filter, SP-430 speaker, MS-1 mobile stand for TR-2500, MC-60A or similar scanning desk top mic. VK1ZVR. Ph: (062) 58 9333.

QSL CARDS: for WIA QSL collection. Rare DX, uncommon & commemorative prefixes, pre-war & excellent pictorial designs especially appreciated. Please write to the Curator, VK3TL, Box 1, Seville, Vic. 3139, or ph (059) 64 3721 & cards will be picked up from your home if you live in the metropolitan area. For country & interstate readers, arrangements for pick-up can be made by contacting the Curator.

WANTED — NSW

FT-101 or TS-520 TCVR: Only complete unit performing at or near spec considered. Pay to round $450 for good clean unit. Max VK2CMS, QTHR. Ph: (050) 30 2464 (Let it ring out).

KENWOOD TR-7400A: 2 metre transceiver in good working order. Contact Herb VK2UJ, QTHR.

QSL CARDS: for WIA QSL collection. Rare DX, uncommon & commemorative prefixes, pre-war & excellent pictorial designs especially appreciated. Please write to the Curator, VK3TL, Box 1, Seville, Vic. 3139, or ph (059) 64 3721 & cards will be picked up from your home if you live in the metropolitan area. For country & interstate readers, arrangements for pick-up can be made by contacting the Curator.

WINCH-UP MAST: around 10 metres. No towers. All calls welcome. Contact Bob L20059, QTHR. Ph: (02) 609 4818.

WANTED — VIC

B2, MCR OR SIMILAR RADIOS: Gary Cain W8MFL, 1775 Grand #302, St Paul, Minn, 55105, USA.

COLLINS KWM2/2A HF TRANSCEIVER: & accessories. DX eng, SP processor, 312B-4 & 312B-5 Consoles, 136B-2 Blanker, 302C-3 watt meter, DL-1 Load, 351R-1 & 2 Racks, MM-1 & SM-3 microphones, valves & handbooks. VK3BFB, QTHR. Ph: (03) 587 1593.

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WANTED — NT

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FOR SALE — ACT

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FOR SALE — VIC

COPPER WIRE: 6mm, 6 strand, approx 100m on wood reel. $70. Portable National Panasonic Radio. Battery, medium wave, 530-1600 kHz, shortwave 5-18 MHz. $25. Ex cond. Ph: (055) 62 6016.

HF TRANSCEIVER: Kenwood TS-180S including CW and SSB filters as well as memory board DC V. Output power can be varied from 10 to 100 watts. Ex cond. $950 ONO. 16 element 2m Yagi $150. Frequency counter up to 150 MHz. $150. Ph: (03) 726 7137 after BH.

FOR SALE — TAS

ANTENNAS: Mini-multi 3 band, 3 element Yagi. $120. Quad kit complete, aluminium spider hub, fibreglass spreaders, 3 band, 2 element $170. VK7JY. Ph: (003) 27 2011.

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Advertiser's Index

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